SOIL CONSERVATION AND FLOOD CONTROL

HEARINGS

BEFORE A

SUBCOMMITTEE OF
THE COMMITTEE ON AGRICULTURE
HOUSE OF REPRESENTATIVES

EIGHTY-SECOND CONGRESS

FIRST SESSION

PART 1

OCTOBER 12, 1951—GATESVILLE, TEX.
OCTOBER 30, 1951—COLBY, KANS.
OCTOBER 31, 1951—TOPEKA, KANS.
NOVEMBER 1, 1951—SIOUX FALLS, S. DAK.

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SOIL CONSERVATION AND FLOOD CONTROL

FRIDAY, OCTOBER 12, 1951

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON SOIL CONSERVATION AND FLOOD
CONTROL OF THE COMMITTEE ON AGRICULTURE,
Gatesville, Tex.

The subcommittee met at Gatesville, Tex., Hon. W. R. Poage (chairman) presiding.

The CHAIRMAN. We are here as members of the Agricultural Committee of the House of Representatives to consider the feasibility and desirability of inaugurating an agricultural flood-control program in the Little River and Bosque River Valleys.

(Thereupon the several members of the committee and Hon. Charles F. Brannan, Secretary of Agriculture, were introduced to the audience.)

(The first witness called was Hon. Charles F. Brannan, Secretary of the Department of Agriculture, who, after the following introductory remarks, outlined the basic program in a prepared address which appears at p. 2.)

STATEMENT OF HON. CHARLES F. BRANNAN, SECRETARY, UNITED STATES DEPARTMENT OF AGRICULTURE

Mr. BRANNAN. Members of the committee, ladies and gentlemen of this area of Texas, and my fellow citizens, I want first of all in the 10 or 12 minutes I shall consume here this afternoon to express my appreciation and great pleasure in the opportunity to be in the Little River watershed area, the opportunity to be again in Texas, and the opportunity to be in the district from which Bob Poage has been sent to Congress, and again to be with the Subcommittee on Agriculture to talk about flood control and general conservation problems.

I would like to say that my opportunity to be here with Bob Poage is especially deeply felt because he has been one of the most active Members of Congress on flood control and conservation, and we of the Agriculture Department always feel we have a very ardent and good friend in Bob Poage and a good adviser when we have problems to discuss.

Once in a while Bob has time to come over to have lunch with us, and he and others were very recently talking about some of these problems, and this is another opportunity to talk about our common problems before the people most directly concerned.

Mr. Poage has asked me to lay the background for the program this afternoon. I am very happy on the part of the Department of Agriculture to do that and especially on some of the problems of river basins, and flood-control problems.

I would like to point out first the intimate relationship between protective farming and conservation. They should go hand in hand. By their very nature the measures for flood control also increase production. The protection of forest land helps in the increase of the growth of timber. Nevertheless, the flood-control aspects are the important part of the agricultural program, and it is axiomatic that conservation is a part of farming.

The agricultural program consists of three parts: First, assistance on the farm; second, flood control; and, third, river-basin projects.

(The witness then explained that the proposed program on the Little River watershed would cost approximately $38,128,000, as planned; that the work broke down into parts consisting of farm and crop control, gully stabilization, and floodwater structures; that the program would require about 15 years, a portion of the cost to be borne by the Federal Government; and that the local State and people who live in the watershed should share in this development.

(The complete prepared statement of Secretary Brannan is as follows:)

STATEMENT OF SECRETARY OF AGRICULTURE CHARLES F. BRANNAN

I welcome this opportunity to discuss with you the Department of Agriculture's resource conservation activities, particularly those that relate to river-basin and flood-control programs.

Before discussing conservation, I should like to point out the intimate relation between productive farming and conservation. They go together hand in hand. By their very nature the conservation measures of modern farming that are applied to the land also increase production. The same measures that control erosion and retard runoff—for instance, terraces and contour plowing—increase the yield of crops. Likewise, fire control on forest land prevents the destruction of the protective forest floor and at the same time increases the growth of timber. As a general rule conservation measures yield greater benefits to the farmer through increased production than they do to others downstream through reduction of floodwater and sediment damages. Nevertheless, the flood-control aspects are an important part of the agricultural program. It is axiomatic that conservation is part of farming.

The agricultural resources conservation program of the Department consists of three main parts. These are (1) assistance to farmers on a farm-to-farm basis, (2) watershed programs under the flood-control acts, and (3) river-basin programs. I shall discuss each of these briefly, giving emphasis to the second one because I know you have a special interest in the flood-control programs in Texas.

Assistance to farmers on a farm-to-farm basis is the Nation-wide program through which the Department of Agriculture has worked with farmers on individual farms to make the most of its progress in conserving agricultural resources. This program covers the regular conservation work of the several bureaus of the Department and includes such activities as agricultural conservation program payments, technical service, extension service works, and credit. These activities are carried out by the Department working through State and county organizations. This program is continuing on a national basis.

The development of our flood-control program has had an interesting history. Some years ago the control of floods became recognized as a function of the Federal Government and the Corps of Engineers of the War Department was given major responsibility for this type of work. Later on people began to realize that farm and forest land can be used to catch water as it falls from the sky and that vegetation encourages it to sink deep into the ground to be stored up against drought or used to grow plants. Surplus water can be led away gently into many little catchments, ponds, or basins, there to provide water for livestock or to be released slowly after flood danger has passed. As these things were demonstrated Congress passed the Flood Control Act of 1936 giving the Department of Agriculture responsibilities along with the Corps of Engineers for developing balanced, coordinated flood-control programs.

The natural unit of area for dealing with water is not State, county, or community boundaries but the natural watershed. Hence the Department began in 1939 its investigations of watersheds to develop programs under the flood-control acts for individual watersheds. The watershed reports resulting from these scientific surveys provide long-time programs adapted to the needs of the watersheds, and they provide adaptations and modifications of the regular Department program within these areas. When authorized by Congress these programs became the "law of the watershed" to which the Department gears its work.

Flood-control programs are important to the people of the watershed because they provide an orderly plan for the development of the land and the control of water which will yield dollar benefits to individuals and to the public at large. In addition there are far-reaching secondary and intangible benefits that will accrue to nearly every resident in the watershed.

This committee, I am sure, is familiar with these watershed programs. But I would like to tell you a little more about them and, to illustrate, I shall talk about the Little River watershed of which the Leon River is a tributary. The report for this watershed was completed and sent to my office in August 1950. Under Federal Interagency River Basin Committee procedure the report was forwarded to the several Federal agencies and the State government for review. Ninety days is allotted for this process of review by agencies outside the Department. As soon as we received the comments from all interested agencies we passed it on to the Bureau of the Budget on January 31, 1951.

Now all this may sound like so much red tape to you folks, but before you pass judgment let me remind you of the importance of obtaining these several viewpoints. First of all, the program recommended in the Little River report is a program of the people. They participated in its formulation, the measures will be installed on their land, they will pay part of the cost, and they will receive a major share of the benefits. Consider also that the technical job of developing a highly complex system of minor engineering structures is not only difficult in itself but also requires close cooperation and subsequent review to achieve correlation with major works of improvement developed by the Corps of Engineers. Finally, the primary function of the Department of Agriculture in the national flood-control program is to abate floods by aiding farmers to adjust their farming operations and to install measures which will keep more of the rain where it falls. To do this requires careful review, approval, and even enthusiasm on the part of the local people. You can easily see that there is a very real need for review and correlation of flood-control survey reports. Such review may make the difference between a workable, effective program and one that is headed for failure.

I don't believe it is necessary for me to go into detail about the Little River flood-control program here within the basin. However, a brief outline might refresh your memories or stimulate further discussion. Measures recommended in the report are estimated to cost $38,128,000 at 1949 prices.

Estimated cost of installing the recommended program—Little River watershed

Measure	Unit	Quantity	Cost (1949 prices)
Terraces	Mile	31,600	$5,651,000
Field diversions	do	680	219,000
Cover crops	Acre	193,100	966,000
Other cropland conservation measures	do	448,090	--
Farm and group waterways	Mile	1,120	238,000
Gully stabilization	do	980	1,258,000
Establishment of new grassland	Acre	107,870	4,769,000
Improvement and management of existing grassland	do	234,630	3,608,000
Floodwater retarding structures	Each	290	20,815,000
Floodway and channel improvement	Mile	7	604,000
Total			[1] 38,128,000

[1] Of this amount 11 percent is for technical services, administration, and educational assistance. It is recommended that non-Federal public agencies bear approximately ½ the cost of educational assistance.

The program will require about 15 years for installation and the Federal Government will pay about $29¼ million of the cost while local interests will be expected to pay nearly $9 million or its equivalent. The annual operation and maintenance cost to be borne by local interests is about $3 million. I would

like to emphasize that the annual cost of $3 million plus the $9 million installation cost gives the people who live in the watershed a major share in this development. In return for these expenditures the people in and near the watershed will obtain benefits estimated to be nearly $13 million annually for a ratio of benefits to cost of 2.95 to 1

As you all know, the Little River is a tributary of the Brazos and so is the Bosque River. Survey reports for the Little and the Bosque have left the Department and are in the mill for approval. Final interagency comments on the Brazos River were received just recently and this report soon will be sent on its way. Other surveys of watersheds wholly or partially in Texas are in various stages of completion—some just beginning, others awaiting comments from the interagency reviews. One of these is the Arkansas-White-Red River Basin investigation which, of course, involves more than flood control.

There are three watersheds partly or wholly in Texas where works of improvement are under way following the recommendations made in flood-control reports. These are the Middle Colorado, the Trinity, and the Washita watersheds. Incidentally no other State has any more than two. Work is under way on two small watersheds in California.

I have mentioned before that the farmer has an important part to play in these flood-control programs. He is in a position to carry forward our battle against floods, erosion, and drought—the complex problems of too much and too little water. With proper assistance he can undertake and finish the task of maintaining and enriching our productivity while at the same time aid in reducing damages caused by floodwater and sediment. The farmer should be a full-fledged member of the team working to improve the Nation's resources. One way he can participate in this important undertaking is by joining with others in forming a watershed association and by applying the principle "in union there is strength" the Nation's farmers can take their rightful place in forwarding conservation through watershed programs. I sincerely believe that we need many more of these useful organizations.

The interest of the farmer in comprehensive river-basin programs should be even greater than it is in flood control. Flood control is an integral part but only a part of a comprehensive program for the development of the water and land resources of a basin. The pressing need for the full-scale development of our great river basins is gaining headway in America. About 4 years ago President Truman said in a message to Congress that "the major opportunity to increase the wealth of the Nation lies in the development of our great river systems." The Congress of the United States endorsed this principle when it passed the 1950 Flood Control Act (Public Law 516, 81st Cong., 2d sess.). In this act the Congress directed the several Federal agencies to coordinate their activities in developing for the Arkansas-White-Red River Basin "* * * comprehensive, integrated plans of improvement for navigation, flood control, domestic and municipal water supplies; reclamation and irrigation; development and utilization of hydroelectric power; conservation of soil, forest, and fish and wildlife resources; and other beneficial development and utilization of water resources * * *." Such a program is a truly comprehensive one for the people of the basin—farmers as well as city dwellers. Concrete evidence of the interest of Texas people in the work of the AWR Committee is the fine spirt of cooperation and the real contributions that Texas agencies are making in formulating plans for the basin. This participation includes the governor, State, and county agencies, soil-conservation districts, and other farmer groups and others. The Department of Agriculture believes that the comprehensive development of our water resources is the lasting answer to flood control and that the land and water must be treated together. We should employ all the technical skill and knowledge at our command inside as well as outside of Government agencies, in developing balanced, economical, and enduring programs for our great river basins.

River-basin planning is in its infancy, but we in the Department of Agriculture do not intend to stand by while it grows up. We expect to continue our regular activities and to press our flood-control program so that Texas and all the other States may enjoy the many advantages of watershed programs under the flood-control acts.

Mr. POAGE. I know you know the practice of this committee, but since our friends here are not familiar with the practice of the committee, it is now in order for members of the committee to question the witness, and if any members want to ask questions I would like

for you to do so now. This is not a dress rehearsal; this is the real thing, now.

Mr. GATHINGS. Mr. Secretary, I believe you said that these measures represent an expenditure of $38,128,000. How many basins are involved to reach that figure?

Mr. BRANNAN. We are talking about the Little River watershed, which includes the Little River itself and such tributaries as the Leon.

Mr. GATHINGS. And it would be built over a period of time but could not be done in a year or 2 years' time?

Mr. BRANNAN. Yes, Mr. Gathings, it would take almost 15 years to do the complete job. That is not unusual because I believe the soil-conservation job which has been outlined for the United States would probably take 50 or 75 years to get it done if we move at the fastest rate authorized by Congress.

Mr. GATHINGS. That $39,000,000 total would be spent by the Government?

Mr. BRANNAN. Of the total $38,000,000, $29½ million is contemplated to be expended by the Government directly. The $9 million is contemplated to be contributed by the States and communities and the farmers, either in cash or by doing necessary work on their own land.

Mr. LOVRE. You mentioned the Wichita and Red Rivers. When is it contemplated that the report will be out on that consolidated project, do you know?

Mr BRANNAN. Well, I can answer it in one sentence: Not as quick as it should be. I would like to add another sentence and say we have been working as hard as we can to get it out. Our job is pretty much done; but, as you know, it must undergo a very careful examination by the Bureau of the Budget, which looks not at the project alone but must consider the money necessary for the national defense and other purposes.

Mr. LOVRE. Am I correct, Mr. Secretary, in assuming that the flood-control program of the Corps of Engineers and that of the Department of Agriculture consists of one integrated program?

Mr. BRANNAN. That is correct. We find it very easy to work with the Corps of Engineers, and the job of integrating our programs has been done with considerable speed.

Mr. LOVRE. Right along the same line, there is no duplication of work between the Department of Agriculture and the Corps of Engineers?

Mr. BRANNAN. There is none whatever. It is to oversimplify to say that they work the channels and we work the land. We help the farmers work their land on which the water falls that goes into the channel in rapid or slow speed.

Mr. LOVRE. There is no conflict of interest?

Mr. BRANNAN. There is no conflict of interest and no antagonism so far as I know.

Mr. HOPE. Just following up what Mr. Lovre has been discussing, do I understand that when you work with the Army engineers such work as in the Red River system, that the Army engineers in planning a dam or structure will take into consideration the work that the Department of Agriculture is going to do in determining the type of dam or reservoir they will construct?

Mr. BRANNAN. That is correct, Congressman Hope. I must say that the Army engineers would sometime feel we are very optimistic, as to how much erosion it will retard, how much siltation it would hold back on the land, and what volume of water it will hold back. We have yet to test out and prove this for ourselves in many respects.

Mr. HOPE. I think that answers my question. In connection with the Missouri River program—there have been recent disasterous floods of this year—I would like to ask the question whether there should not be some revision on the part of the Army engineers of their plans?

Mr. BRANNAN. Well, Mr. Hope, I think in general terms what you suggest should be done. As a matter of fact I think it is being done in part, that the Army is reviewing some of its major structural work in connection with some of the things the Department of Agriculture says the farmers can do; and I think it is desirable and that it will be done, and that we will go back to reviewing them currently; and I think that is what Congressman Thomas had in mind when he put in his bill to put the Army and the Department closer together in this work.

Mr. HOPE. I am glad to hear that there is some concern in the Missouri Basin about that situation.

Mr. HOEVEN. Mr. Secretary, I appreciate your frankness in saying this is a long-range program and the project will not come into being overnight, that it would be about a 50-year proposition. I think that the people here should understand if the Committee on Agriculture should approve any project that the main fly in the ointment is the appropriation. Congress took the position this year that we would not approve any new projects. I simply want to point out that a new project is going to have about as hard a time as an old project. Do you agree with me?

Mr. BRANNAN. I agree with you that we are going to have a tough time getting the money for some of these projects. If we continue to ask the American farmers to produce as abundantly as they have this year, we owe them the obligation also to see that they have the wherewithal. I would just like to say I am sure I am not arguing with you at all, and I think you will agree that this whole job cannot be disassociated from the defense effort.

Mr. HOEVEN. I am sure there is not a member of this committee who would disagree with you on that point. We are trying to do our part in emphasizing the part that agriculture has in the defense effort. We have to sell the members of the Appropriations Committee on the proposition that what we are talking about is a part of the defense effort.

Mr. BRANNAN. I am sure that is right, and it will take a good deal of effort, and I know the members of the Agricultural Committee are going to support us when we go before the Appropriations Committee with the kind of program you propose.

Mr. LOVRE. May I ask another question. When I go back and when this committee meets I will know what your opinion is. I assume from your answers you gave to my questions that there is no conflict of interest in any way with the work of the engineers?

Mr. BRANNAN. I don't know that I will say that there are no conflicts at all. We were not permitted by circumstances to participate in the original plans. If we had been I think we would have advocated

greater emphasis on the off-channel work. I think we might have different ideas about how we could do soil-conservation work, and I don't want to slam the door on myself. I think we know things we did not know 5 years ago. I think that these things ought to be vital and life subjects of review and improvement from day to day, from year to year at least. We certainly don't think that the program of the Department of Agriculture is so good that it cannot be improved, and we are working here every day trying to improve it; and I want to say in behalf of my fellow employees that they are improving every day.

Mr. LOVRE. We can always improve, but as you stated in the beginning this is pretty much of an integrated program—the Army deals with the main stream—there is no conflict of interest?

Mr. BRANNAN. Certainly we have no desire or intention to tell anybody how to build a dam on the channel, or any intention to tell where to build a dam. Those things are the results of highly technical engineering skill which the Department of Agriculture does not have. We have engineers in other fields but we are not the people to deal with dams like the Boulder Dam and others.

Mr. LOVRE. While it is true that in the case of the Missouri River program that you did not have a chance to participate and collaborate with the Army engineers at the time those things were worked out, is it not true that in the study of the Red and Wachita and White River projects the Department of Agriculture is being consulted and is sitting in?

Mr. BRANNAN. That is correct.

Mr. LOVRE. The situation that has arisen in the Missouri Valley should not arise in the other basins?

Mr. BRANNAN. That is correct.

Mr. LOVRE. You at least will have ample opportunity to submit your views?

Mr. BRANNAN. That is right.

Mr. POAGE. If there are no further questions to the Secretary we want to thank you, Mr. Brannan. I know you have contributed to the success of this hearing and added to the information of the committee, and we deeply appreciate your contribution to this part of the program.

The next witness before the subcommittee is Mr. Lewis P. Merrill, regional director of the Soil Conservation Service.

STATEMENT OF L. P. MERRILL, REGIONAL DIRECTOR, SOIL CONSERVATION SERVICE

Mr. MERRILL. In the interest of time I will not attempt to present any views of my own, and in the further interest of time I will present only portions of the statement prepared by Dr. H. H. Bennett, Chairman of the Department of Soil Conservation today.

I think perhaps every person in this audience feels a personal acquaintance with the Chief of the Soil Conservation Service. I am sure you are disappointed that he is not here. Unfortunately, he was taken ill just before he had to leave Washington and it was impossible for him to come. I am happy to have the privilege of reading portions of his statement to you.

FLOOD CONTROL IS URGENT

We must do what we can to prevent these staggering flood and erosion losses in crops and soil, property, and human lives. Some people feel we can't afford the cost of flood control in these times of national emergency. Soil-conservation service does not cost the Government anything. It is a national investment which pays back into the Treasury the principal, plus a very good dividend in dollars, derived from per-acre increase. I want to say in the beginning that I am convinced floods can be controlled to a very large degree.

COORDINATED FLOOD CONTROL PLANS ARE ESSENTIAL

We must develop a soundly coordinated plan for every watershed to assure a properly balanced and truly effective attack on prevention of flood damages. Our efforts to control floods must begin in the very uppermost parts of watersheds. Our job of flood control, then, begins where the rains fall and continues until the water reaches the ocean. Floodwater damages to agricultural lands in thousands of miles of small creek bottoms throughout our watersheds represent just as much loss per acre as flooding of the wide Missouri River Valley above St. Louis.

1951 FLOOD DAMAGE ON UPSTREAM WATERSHEDS

Losses of crops on upland farms amounted to approximately $110 million. Losses of topsoil were estimated at something like $200 million. Losses from floodwater and sediment in the creek bottoms and small stream valleys above the points where flood protection is usually proposed were estimated at $102 million. The total of these three figures is $412 million.

UPPER WATERSHEDS ARE SOURCE OF GREATEST FLOOD LOSSES

Our survey indicates that around three-fourths of our average annual flood loss occurs above the main river valleys and large cities. We must control erosion to prevent downstream flood-control reservoirs from rapid silting and loss of their capacity and effectiveness; but, above all, we must control soil erosion to prevent our Nation from going the way of some past nations or areas, where the people failed to take care of their land. We permitted here in the United States, according to our erosion surveys, severe damage and outright ruin for immediate practical cultivation of an area of arable land amounting to nearly 200 million acres. We were at least 100 years late in starting this national program of soil and water conservation, but that is water under the bridge.

SOIL CONSERVATION SERVICE'S FLOOD CONTROL POLICY

1. Flood prevention is a job which begins in fields and pastures and farm woodlands, and ends only when the runoff has safely reached the ocean.
2. We believe in coordinated planning with the Army Corps of Engineers, soil conservation districts, etc.
3. That the work of the soil conservation is in fields and pastures and valleys of small creeks—upstream tributaries of the major rivers.

PRINCIPLES OF WATERSHED TREATMENT

(1) Land treatment: Treating every acre of land according to its needs.

(2) Upstream engineering: For waterflow retardation and channel stabilization.

(3) Downstream engineering for flood control: Congress has so far authorized watershed programs on 11 watersheds in different parts of the country.

IMPORTANCE OF GROUP ACTION THROUGH SOIL CONSERVATION DISTRICTS

For a watershed development program to operate successfully, the basic responsibility for that program should be with the people residing in the watershed.

SPECIAL TECHNICAL SKILLS ESSENTIAL IN WATERSHED TREATMENT

Technical know-how is required to successfully plan and apply needed conservation treatment. Such plans must be based on painstaking research and practical experience. They must take into account the principles of hudrology, engineering, agronomy, forestry, biology, and other fields.

WATERSHED TREATMENT BENEFITS AMPLY DEMONSTRATED

In the work on the Washita and other river valleys we have estimated that average flood damages amount to approximately $4,375,000 annually along the tributaries, and $1,325,000 annually along the main stream. Available evidence indicates that completion of the land treatment program alone over the entire watershed (Washita) would reduce average annual floodwater and sediment damange by approximately 30 percent. These flood prevention measures alone would reduce average floodwater and sediment damage in the entire watershed by approximately 43 percent.

WATERSHED TREATMENT PROTECTS RESERVOIRS

Part of the needed adjustments in land use and application of conservation practices resulted in a 24-percent reduction in the silting rate of the municipal reservoir at High Point, N. C.; 38 percent in the silting rate of the Waco, Tex., water supply reservoir; and 53 percent in the silting rate of the reservation lake at Clemson, S. C.

HOW WATERSHED TREATMENT COULD HAVE REDUCED 1951 FLOOD DAMAGES

Any such reduction in damages could result only from putting more of the rainfall into the reservoir of the soil, thus slowing down the rate of runoff.

PROGRESS BEING MADE IN WATERSHED CONSERVATION

The groundwork for upstream flood prevention work has now been laid; public understanding is well advanced; and a creditable start has been made toward achieving that part of the goal which involves conservation on every acre of land. There has been a serious lag in

getting authority and funds for the complementary upstream engineering work which is so vital to watershed flood protection.

THE JOB AHEAD

As we see it, the primary immediate needs are for (1) more technical assistance as well as other facilities, where needed, to speed up the application of soil and water conservation measures to the land; and (2) authorization and facilities to install upstream engineering measures on small watersheds in order to complete the total watershed protection job as a coordinate part of the river basin plan. As a nation, we have no excuse for not doing the job of conserving our basic soil and water resources; indeed, we dare not shirk it, because our individual and national security, peace, and prosperity depend on it.

STATEMENT OF DR. H. H. BENNETT, CHIEF, SOIL CONSERVATION SERVICE

It is encouraging to be asked to present to this committee some of my ideas with respect to our national problem of flood control.

The recent flood catastrophe in Kansas and adjacent Midwestern States has once more focused attention on the urgent need for doing something speedily that will prove really effective in preventing the recurrence of disastrous floods, which every year somewhere in the country, do great damage to productive farm lands; destroy property in cities, towns, and rural areas; and often take the lives of human beings.

FLOOD CONTROL IS URGENT

What we can do—what we must do, as I see it—to prevent these staggering flood and erosion losses in crops and soil, property, and human lives depends in large degree on the determination and efforts of the thinking people of the country and their leaders.

Some people feel that we can't afford the cost of flood control in these times of national emergency. This is a natural reaction, but it probably is not always based on a full understanding of how floods retard our production for national defense, both in industry and agriculture. Furthermore, they may not understand the conditions and circumstances involved with a reasonable solution of the flood problem. Besides, soil conservation work, according to the experience of the Soil Conservation Service, does not cost the Government anything. It is a national investment which pays back into the Treasury the principal advanced to pay the salaries and expenses of our technicians assisting soil-conservation districts—plus a very good dividend in dollars, derived from per-acre increases.

I have not come here to tell you what the Nation's land and water policy should be, but rather to offer some suggestions that may contain something of usefulness to you in your considerations with respect to such a policy. There are some things I can say definitely. For example, there is no doubt about some aspects of the flood problem: Cloudbursts and swollen rivers do not wait until we have settled our score with the Communists and the other problems that so often plague the Nation. Floods are not in the least concerned with State and county boundaries; however, they do have a very intimate relation to watershed areas, drainage basins, and land conditions within such areas. They are affected, too, by what man does toward beneficial control and land conditions and use within watersheds, as well as what he does to make prudent and helpful use of the rains that fall within watersheds.

At this point, I want to commend the decision of this committee to hold hearings in the field where our flood and land problems can be examined at first hand and where the people living in day-to-day contact with these problems can be consulted. In this, and in no other way, can our out-of-doors problems be studied in their true perspective and relationships to the general welfare.

Moreover, getting around the country where our land, water, and agricultural problems are met with face to face is the best possible way for gaining a clear understanding of the physical facts involved with the alleviation of such im-

portant national problems as flood prevention and related problems of soil erosion, sedimentation of reservoirs, deposition of the infertile products of erosion (as sand) over productive alluvial lands, shoaling of stream channels and harbors, and the filling of drainage and irrigation ditches.

I want to say in the beginning that I am convinced floods can be controlled to a very large degree. It is possible, I am sure, to eliminate almost completely the floods that occur almost every year along the great majority of our small tributary streams. It is practicable, also, I believe, to greatly reduce floods and flood damages along our trunk streams, even the superfloods resulting from record storms like those that produced the Kansas flood this past spring.

Our flood surveys of a considerable number of important representative drainages like the Brazos, Bosque, and Trinity in Texas and the Washita in Oklahoma, indicate that around 75 percent of our total flood damage occurs along the "little waters" (tributary streams), above the effects of any ordinary major-stream flood-control works, such as major reservoirs and main-stream levees.

COORDINATED FLOOD CONTROL PLANS ARE ESSENTIAL

No single method of flood control, however, will do the whole job. We have seen in the great Kansas flood, for example, how levees high enough to have withstood the largest previous flood of record were overtopped. On the other hand, we have seen, also, in the recent Kansas flood how the soils, even in some of the best pastures, because so nearly saturated after 2 months of heavy rains that their water-absorptive capacity was greatly reduced before the final big rains. So, to meet all kinds of flood conditions and to prevent or minimize flood damages wherever and whenever they occur, we must use every available method of control.

We must devlop a soundly coordinated plan for every watershed to assure a properly balanced and truly effective attack on prevention of flood damages. The day of piecemeal control operation—where only a part of the damages in a watershed are considered—is rapidly drawing to a close in flood control, as in the related field of soil erosion control.

Our efforts to control floods must begin in the very uppermost parts of watersheds. We must, beginning far upstream, get what water we can into the soil and hold or retard the excess on farm fields by soil conservation practices applied on the land as needed. What does run off the fields into the drainageways and creeks we must slow down with small retarding structures. What flows on out of the creeks we will have to handle in the main river valleys by more imposing measures, such as impounding reservoirs and levees.

Our job of flood control, then, begins where the rains fall and continues until the water reaches the ocean.

The important problem now confronting all of us is to determine, in understanding cooperation with one another, what kinds and combinations of measures are needed, watershed by watershed, to accomplish the most effective flood control that may be found feasible. In doing so, we must, of course, bear in mind our continuing need for irrigation storage, for power production, for municipal water supplies, for pollution abatement, for preserving fish and wildlife habitats and resources, and especially the need for maintaining maximum agricultural production on fertile valley soils. There will be no way to avoid this—not completely, at any rate.

Our watershed plans must provide not only for the control of floodwaters but also for their conservation for beneficial use where such use conforms as nearly as possible with minimum hardships for local people. In this connection let us bear in mind that the limited number of available sites for larger reservoirs should be considered in relation to multiple land and water needs before they are dedicated solely to flood control.

There is more than one reason why sound and enduring flood control, which will benefit all the people, can be achieved only by a coordinated attack. The first of these reasons is apparent from the distribution of flood damages. Although some engineers may dispute what I say, I submit that flood damages begin where the rain falls on the land. The crops on upland farms that are beaten down and blown down and washed out in the storms that cause great floods are just as much lost as the crops that are on land overflowed in the valleys below. The soil washed off upland fields reduces the productivity of the land just as much as does deposition of the products of erosion by water flooding over agricultural bottom lands along the rivers. Floodwater damages to

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agricultural lands in thousands of miles of small creek bottoms throughout our watersheds represent just as much loss per acre as flooding of the wide Missouri River Valley above St. Louis.

1951 FLOOD DAMAGES ON UPSTREAM WATERSHEDS

The Soil Conservation Service made a preliminary survey of the storm and flood damages in the Kansas-Nebraska part of the midwestern area following the July flood, this year. This is what we found: Losses of crops on upland farms amounted to approximately $110,000,000. Losses of topsoil, the thin and fertile layer that relates so importantly to sustained agriculture in this great granary area, was estimated at something like $200,000,000, based on the differences in crop yields with different depths of topsoil. Losses from floodwater and sediment in the creek bottoms and small stream valleys above the points where flood protection is usually proposed were estimated at $102,000,000. The total of these three figures is $412,000,000.

Without in any way minimizing the staggering loss at Kansas City and along the major river valleys, it is believed that these figures are convincing evidence that a flood control program aimed only at downstream cities and river valleys is only a partial flood control program and not one designed to benefit all the people who have suffered losses.

Let me give another reason why this country needs a coordinated flood control program extending from every upland acre to the sea. Superfloods like this one of last July are comparatively rare events. I am told that the flood discharge at Kansas City far exceeded the highest ever previously experienced, which was back in 1844. When an event exceeds all previous expectations and wreaks such havoc, it not only makes banner headlines, but it becomes an historic classic. It even gets in the textbooks. People come to look on it as characteristic rather than rare, or unique. Actually, if one spreads the enormous estimated damage caused by this flood over all the years between such rare events, the average annual loss is considerably less than the damages from all the smaller local floods that occur year after year in smaller watersheds throughout Texas, Oklahoma, Kansas, Nebraska, Missouri, and adjacent States.

UPPER WATERSHEDS ARE SOURCE OF GREATEST FLOOD LOSSES

Our surveys indicate that around three-fourths of our average annual flood loss occurs, as already noted, above the main river valleys and large cities. This, of course, is due in no small measure to the fact that a substantial part of our major river floodplains and cities is already protected by levees and major reservoirs, for which credit is due primarily to the effective work of the Army Corps of Engineers.

I can give you still another reason why a coordinated approach to flood control is essential. Soil erosion on watershed lands must be brought under control to protect downstream flood-control works. We must control erosion to prevent downstream flood-control reservoirs from rapid silting and loss of their capacity and effectiveness. We must control erosion to prevent the silting of stream channels which further reduces their flood-carrying capacity. We must control erosion to prevent overwash of infertile sand and subsoil material on our fertile bottom land soils. But even more important than all of these, we must control soil erosion if we are to maintain the base of our agriculture, our national defense, even prevent our Nation from going the way of some past nations or areas, where the people failed to take care of their land.

I have often referred to the downfall of past civilizations because of neglect of their agricultural lands. But when we undertake to find the causes for such neglect of man's most indispensable resource—productive land—we sometimes find ourselves unable to reach any very positive conclusions beyond the more or less meaningless feeling that perhaps man may not yet have progressed to the stage of civilization, not to mention the stage of "enlightenment." Even here in the United States—and in nearly every agricultural county of the Nation—we watched our flood-swollen rivers run red, yellow, or black, apparently without stopping to consider that these colors meant but one thing: Flood-borne silt—soil, that is, and mostly rich topsoil—millions on millions of tons of it, stripped from corn rows and cotton rows running up-and-down-hill against all dictates of nature.

Why it took us so long to understand the deadly significance of this malpractice on the land, sometimes makes me turn away from the thoughts of it to

more pleasant things. But it is hard to get away from the cold, terrible truth that in this great Nation we at one time were wasting our productive land by unnecessary erosion faster than any Nation or race we have known about. Vast tracts of land have been stripped down to bedrock, but the probability is that people lived in these areas for thousands of years, whereas white man has been here in America only a few decades by comparison.

Think of it: We permitted here in the United States, according to our erosion surveys, severe damage or outright ruin for further immediate practical cultivation of an area of arable land amounting to nearly 200 million acres. A considerable part of this land has since grown up to trees or brush or grass having some value, but it is mostly low-rate land for purposes other than grazing. And the billions of tons of soil that were scoured off these neglected or abused acres have gone to fill reservoirs; to clog stream channels, reducing their capacity to carry the runoff from heavy rains; and to cover formerly good bottom land with mud and sand and poor eroded subsoil—in some instances, as along many of the streams of the old Piedmont cotton country of the Southeast, to depths varying from 5 to 20 feet or more.

In 1911, in Fairfield County, S. C., I helped with a soil survey where 46,000 acres of formerly cultivated stream bottom, representing some of the best land in the country, had been converted into useless swamp or semiswamp by filling of the stream channels with the products of erosion washed down from upstream fields of cotton and corn. The published report said of this land 40 years ago: "Formerly the areas of meadow were among the most productive soils of the county, but the wash from the uplands, where, owing largely to poor management, erosion has been severe, has covered the original soils with deposits, largely sand, and made them worthless for cultivation." And it was 22 years after the publication of that first erosion survey of all history (so far as known) that this greatest Nation of the world began a program of soil conservation.

We were at least 100 years late in starting this national program of soil and water conservation, but that is water under the bridge. We can say now, however, that we do finally have a going and highly successful program of erosion control, runoff retardation, and water conservation under way.

SOIL CONSERVATION SERVICE'S FLOOD-CONTROL POLICY

So that there may be no mistake about where we stand with respect to flood prevention and control in the Soil Conservation Service, let me reaffirm—

1. That we believe, and our wide experience confirms, that flood prevention is a job which begins in fields and pastures and farm woodlands and ends only when the runoff has safely reached the ocean.

2. That we believe wholeheartedly in coordinated planning and treatment of entire watersheds (drainage basins) in cooperation with the Army Corps of Engineers, soil-conservation districts, watershed associations, together with all other Federal, State, and local agencies that have anything to contribute to land protection and water management.

3. That the work of the Soil Conservation Service is in fields and pastures and the valleys of small creeks—upstream tributaries of the major rivers. Our job is first to assist land owners and operators to use their land in accordance with its capability and to treat it with sound conservation practices in accordance with its needs. Beyond this our job is to assist organizations of local people to install upstream flood-prevention measures such as small retarding structures, gully plugs, and channel improvements on watershed lands. If through such a program we can cause the water which falls in the upper watersheds to delay its race to the sea we have won a part of our objective. Moreover, we know that such a program can prevent a large part of the soil loss which not only is ruinous to agricultural land but lessens the effectiveness of flood-control reservoirs downstream. This kind of program alone will not, however, prevent flooding of the main river valleys and the cities in them.

We believe that coordination of the river control and watershed programs was the intent of Congress when it passed the Flood Control Act of 1936. We believe it is still the intent of Congress. It is not felt that Congress intended one program to be in any sense a substitute for the other but rather that the programs of the Army engineers and the Department of Agriculture should be complementary parts of a single job to be done.

The Flood Control Act of 1936 and subsequent acts provided authority, as I understand it, for the Department of Agriculture and the Corps of Engineers to work together in planning and carrying out a complete program for

alleviating flood damages and conserving soil and water resources. Such watershed and river-basin plans for flood control, as we see it, involve three principal types of operations, namely:

PRINCIPLES OF WATERSHED TREATMENT

(1) *Land treatment.*—Our conservation farm and ranch planning is based on the principle of treating every acre of land according to its needs and using each acre according to its capabilities (for cultivated crops, grass, timber, or wildlife). It also includes safe and orderly disposal of runoff water originating on farms and ranches. Effective conservation treatment of the land prevents erosion, maintains soil fertility, conserves water in the soil, prevents farm damage from rainfall and runoff, and reduces sediment loads of streams. Such land-treatment measures are now being rapidly installed by landowners through the programs of locally organized soil-conservation districts, aided by technical assistance from the Soil Conservation Service and by other forms of assistance such as extension education, PMA incentive payments, and credit. We have ample authority for such programs, but funds available for technical assistance fall far short of needs if it is expected to achieve substantial flood protection in the next 10 to 15 years.

(2) *Upstream engineering for waterflow retardation and channel stabilization.*—This phase of the watershed plan involves work on tributary streams with both vegetative and structural measures in order to retard runoff from the farms within the drainage basins.

(3) *Downstream engineering for flood control.*—This downstream work is done along major waterways to control runoff after it has reached the main channels. It prevents damage to urban people, industrial and other property, and to agriculture in the flood plains along the principal rivers. Such work is the responsibility of the Army Corps of Engineers.

There you have, as we understand it, a coordinated approach to flood control—a program that protects the farmer and rancher of the upland and in the lowlands, and city people as well.

Congress has so far authorized watershed programs, including land treatment and upstream engineering, on 11 watersheds in different parts of the country. Many of you no doubt are acquainted with the work under way in the Trinity and middle Colorado River watersheds here in Texas or the Washita River watershed in Oklahoma. We are carrying out the works of improvement in these flood-control projects, as in the other eight, primarily through soil conservation districts. In those watersheds where there are major forestry problems, the Forest Service shares responsibility in carrying out the programs.

IMPORTANCE OF GROUP ACTION THROUGH SOIL-CONSERVATION DISTRICTS

We have found that the most efficient way of carrying the soil- and water-conservation job beyond the planning stage anywhere is through coordinated group action of the land owners and operators, with technical and other assistance from other sources. Group action is especially effective and necessary in dealing with problems of watershed extent. Soil-conservation districts themselves, of course, are basically group-action devices; and their efficiency and success in this direction have been proved by their rapid organization and growth. In only 14 years, as of September 1, 1951, there had been organized 2,366 such districts in the 48 States, Alaska, Hawaii, Puerto Rico, and the Virgin Islands. They now include more than four-fifths of the farms and ranches in the United States and three-fourths of the country's farm land. About 94 percent of the farms and ranches of Texas are covered by soil-conservation districts (163 districts), which include more than 155 million acres and something over 363,000 farms and ranches.

Moreover, we believe there is a place for watershed associations, conservancy districts, or flood-control districts which have as their objective bringing together the interests of farmers and city people. In other words, for a watershed development program to operate successfully in Texas, Nebraska, or anywhere else, the basic responsibility for that program should be with the people residing in the watershed. That means a local responsible agency, such as a soil-conservation district, watershed association, or flood-control district, which is representative of all the interests in the watershed and which can act to coordinate the activities and services of all agencies and interests to formulate a broad, flexible program for watershed development and protection.

When a watershed is recommended as a good basis for flood-control operations, it should be pointed out that a watershed is not just an inanimate geographical area to be dealt with arbitrarily by outlining it on a map. People are part of a watershed, an essential part, along with animal and plant life, soil, water, minerals, and all of its resources. But people are the starting point in watershed development, and preferably "self-starters," through individual group initiative and action.

SPECIAL TECHNICAL SKILLS ESSENTIAL IN WATERSHED TREATMENT

Let me emphasize, however, that planning and application of the watershed program require special technical skills. Downstream, as you know, the highest order of engineering skill is necessary for building big dams and main-channel stabilization works. Also, up on the watershed, technical know-how is required to successfully plan and apply needed conservation treatment. Such plans must be based on painstaking research and practical experience. They must take into account the principles of hydrology, engineering, agronomy, forestry, biology, and other fields. Under varying conditions of climate, topography, and drainage, the wrong thing done or the right thing left undone at some critical point can do serious injury to an entire farm.

In no event can this watershed planning and treatment be accomplished by some magic formula overnight, although it takes heavy rains and floodwater runoff only a few days, or even hours, to do irreparable damage to watershed land and property. Our conservation land treatment and upstream engineering are based, in the first place, on detailed land-capability surveys that show, acre by acre, the needs and adaptabilities of the land in relation to such combination of factors as soil, slope, rainfall, and erosion. Our watershed plans involve the location of sites for small floodwater-retarding structures, water-disposal systems, gully-control structures, stream-bank stabilization, and other upstream engineering measures.

Within the framework of watershed plans the landholders and the Soil Conservation Service technicians, working out on the land together, make conservation plans of individual farms, acre by acre, field by field. This is an essential procedure. You cannot depend on windshield surveys and office-desk planning when you set about doing a job of the complexity and magnitude of land treatment and upstream engineering. Nor can you have a ready-made plan or set of practices to slap onto any given farm or watershed. Land, and the behavior of the water that falls on it, differ from watershed to watershed, from farm to farm, and from acre to acre. So every watershed and each parcel of land must be dealt with individually.

That, briefly, is how we go about this new treatment (modern soil- and water-conservation treatment) of agricultural land to assist in the prevention and control of flood and erosion damages. We have developed in this program a unique combination of soil conservation, engineering, and forestry practices designed to dispose of surplus water safely and also to make the best practical use of the water that otherwise would be wasted. For the first time in history we are going into the small watersheds far upstream, the tributaries of our main waterways, and there we are seeking to provide relief from recurring flood damages to the small farmer or landowner who, year after year, has been undergoing hardships through crop and soil losses. At the same time we are providing a measure of relief for urban and other interests farther down these tributaries.

WATERSHED-TREATMENT BENEFITS AMPLY DEMONSTRATED

There isn't any guesswork about what such a program will do. We know from repeated experience and from surveys on a variety of watersheds what the measurable benefits of this upstream work in reducing flood damages amount to.

Let me summarize our accomplishments in the Washita River watershed in Oklahoma. I use this area as an illustration because we have finished more work there than anywhere in this region. But similar and equally effective programs are now going forward in the Trinity and middle Colorado watersheds in Texas.

The Washita River watershed is about 300 miles long and some 25 to 50 miles wide. It contains a little more than 5 million acres. Numerous tributaries enter the wide, fertile main-stem flood plain along its entire length.

Local storms cause severe and frequent floods on the tributaries but only small floods on the main stem of the Washita. General storms covering large parts of the watershed often result in severe flooding on the main stem of the river as well as flooding on most of the tributaries.

Some tributaries have as many as nine overflows a year. The most frequent flooding on any part of the Washita River itself averages slightly in excess of two floods a year. Due to the large aggregate area subject to flooding and the greater frequency of flooding, most of the damage in the Washita River watershed occurs on its tributaries.

We have estimated that average flood damages amount to approximately $4,375,000 annually along the tributaries and $1,325,000 annually along the main stem.

We started flood-prevention work in a small way in this area in 1946 as authorized by the Flood Control Act of 1944. All our work has been carried out in cooperation with local people who have paid a substantial part of the cost. Considerable progress has now been made in accomplishing needed changes in land use and in applying conservation measures and practices such as terraces, cover cropping, strip cropping, contour cultivation, and seeding and fencing of grasslands in many parts of the watershed. In a few subwatersheds all the needed runoff-retarding structures and associated flood-prevention measures have been installed.

The conservation measures are being installed under the going soil-conservation districts program but at an accelerated rate in the subwatersheds selected for flood-prevention work. Available evidence indicates that completion of the land-treatment program alone over the entire watershed would reduce average annual floodwater and sediment damage by approximately 30 percent.

Small upstream floodwater-retarding structures and related works, such as floodwater diversions, drop-inlet structures for gully stabilization, floodways, and channel improvements in subwatersheds, have been found highly effective in further (over and above normal soil-conservation work on farms and ranches) reducing floodwater and sediment damage. The extent of the need and economic justification for such flood-prevention measures has been determined for a number of tributary subwatersheds in the development of work plans. On this sampling basis, it is estimated that the flood-prevention measures needed for the entire watershed of the Washita River include approximately 650 floodwater-retarding structures, 200 miles of floodwater diversions, 420 drop-inlet structures, and 90 miles of floodways.

The drainage areas above the 650 floodwater-retarding structures would total 3,085 square miles, or almost 40 percent of the entire watershed. The drainage areas of the individual structures usually vary from 2 to 10 square miles. These small earth-fill dams, generally 25 to 50 feet high, would have a total detention capacity of approximately 960,000 acre-feet. They would hold back an average of 6 inches of runoff from all the drainage area above them. The detention pools are designed to hold back at least the maximum runoff to be expected once in 25 years, and the sodded spillways are designed to pass safely the maximum flood of 100-year frequency occurring when the detention pool is filled. Floodwater is released through automatic draw-down tubes at such a rate as to prevent overflow of the channels below the dams.

The detention structures would generally be located at the upper ends of tributary valley flood plains. Thus they would cause flooding of only a minimum amount of fertile bottom land. It is estimated that only 5 percent of the tributary flood-plain area would be inundated by the permanent pools of the floodwater-retarding structures. Of this land only about a third is now cultivated.

These flood-prevention measures alone would reduce average annual floodwater and sediment damage in the entire watershed by approximately 43 percent.

The land-treatment measures and tributary flood-prevention measures, installed concurrently by subwatersheds, as is now being done, would, when completed over the entire Washita River watershed, reduce the total floodwater and sediment damage by an estimated 73 percent. This damage reduction provides a highly favorable ratio of benefits to costs for the program. The tributary damages, which are more than three times the main-stem damages, would not be reduced by any combination of larger flood-control reservoirs, levees, or channel improvements on the main stem or the lower reaches of the major tributaries of the Washita River. On the other hand, it should be recognized that the damage reduction would be less for large storms such as that which produced the super flood on the Kansas River in July, this year. To prevent extensive damages from such super floods, additional main-stem and major-tributary reservoirs, levees, and channel improvements would be needed.

Flood-prevention measures installed in Owl, Barnitz, and Sandstone Creeks, important tributaries of the Washita River, have already demonstrated their effectiveness.

Owl Creek, a tributary entering the Washita River about 3½ miles northwest of Pauls Valley in McClain County, has a drainage area of nearly 20,000 acres. Thirty-five percent of the watershed land is cultivated and 42 percent is used for pasture. More than 12 percent of the watershed is flood plain subject to frequent overflow. The fertile bottom-land soils are potentially the most productive in the area. During the 20-year period from 1923 to 1942, inclusive, 19 floods were large enough to cover more than one-half of the bottom lands. There were 88 smaller floods. More than 60 percent of all floods occurred in the spring and early summer months during the growing-crop season.

A flood on May 9–11, 1950, was the most severe since 1908. Flood damages were substantially reduced, however, as a result of completion of more than 50 percent of the land-treatment measures and of 4 floodwater-detention structures out of a total of 13 planned. The storm of May 9–11 produced a maximum rainfall of approximately 13 inches in the drainage area above the 4 structures. These structures have a flood-detention capacity for more than 4 inches of runoff and an additional permanent pool capacity of more than 1 inch. At the time of the storm the permanent pools were only partially filled. Despite the exceptional rainfall, water flowed through the emergency spillways of only 2 structures and did not reach the level of the spillways on the other 2. Water was kept within channel capacity below the structures and streams did not overflow until they had gathered water from uncontrolled areas further downstream.

When the entire watershed treatment plan for Owl Creek is completed, there will be nearly 80-percent reduction in acres flooded by this combination of soil-conservation and flood-prevention measures. In addition, the flood protection will permit more intensive use of bottom lands and thereby will increase the net annual income to the land by an estimated $25,000. The total flood-control benefits are estimated to be nearly $42,000 annually for this 20,000-acre watershed.

Based on the estimated total cost of the program, $446,000, it is apparent that the initial investment will be returned in approximately 10 years. Computed on an average annual basis, the ratio of benefits to costs is more than 4 to 1.

Similar benefits have been shown by flood-prevention measures installed in Sandstone Creek watershed, between Elk City and Cheyenne, which has an area of 65,000 acres. On May 16, 1951, a storm producing 4½ inches of rainfall over this watershed did not even cause water to come up to the draw-down pipes in the flood-detention reservoirs, and none of these reservoirs was filled. This creek, which has been noted for its flooding, contributed practically no flow to the Washita River while adjacent creeks were flooding and doing great damage.

Farther east near Clinton, Okla., during the same storm period, the Barnitz Creek watershed, containing 178,000 acres, received up to 13 inches of rain within 24 hours. Within this watershed, 4 floodwater detention structures had been completed out of a total of 53 such structures planned. A substantial part of the supporting land treatment practices such as terracing, regrassing, contouring, and similar practices had been completed on the watersheds of these structures. In that part of the watershed controlled by the structures, the creek stayed within its banks and prevented all damage for a considerable reach below. Neighboring creeks where no flood-prevention measures had been installed caused severe flood and sediment damages.

WATERSHED TREATMENT PROTECTS RESERVOIRS

We have measured rates of silting in some reservoirs two or three times—first before any conservation work was done on their watersheds and then after a substantial part of the needed conservation measures had been applied. Part of the needed adjustments in land use and application of conservation practices resulted in a 24-percent reduction in the silting rate of the municipal reservoir at High Point, N. C.; 38 percent in the silting rate of the Waco, Tex., water supply reservoir; and 53 percent in the silting rate of the recreation lake at Clemson, S. C. In contrast, we found that more intensive use of land for row crops and lack of conservation measures caused an increase of 20 percent in the silting rate of the water supply reservoir at Decatur, Ill., mainly during World War II.

HOW WATERSHED TREATMENT COULD HAVE REDUCED 1951 FLOOD DAMAGES

Based on all these field observations and measurements, on our research data from three experimental watersheds and more than a dozen erosion experiment stations, and on sampling of soil, slope, erosion, and present land use conditions within the area of the recent midwestern flood disaster, we have made some estimates of what a complete watershed treatment program would have done. First, land treatment measures planned on the basis of land capability determinations and applied acre by acre on the basis of needs would have reduced sheet erosion losses by more than two-thirds over the whole area and at the same time would have increased crop production. If we installed, in addition, the upstream engineering measures on small watersheds, we believe it would be conservative to say that the useful life of downstream reservoirs would be doubled.

In big storms like the one that brought on the Kansas Missouri-Oklahoma flood of last July, the watershed program, of course, would have less effect relatively than it would on the average of all storms. The floodwater and sediment damages of $102,000,000 above points where reservoirs and levees have been proposed on major rivers would have been reduced, however, by an estimated 38 percent as a result of the watershed program. On the other hand, taking the average of all flood and sediment damages year in and year out from all kinds of storms, the watershed program would, we estimate, effect a reduction of 66 percent. This estimate applies only to damages above the main river valleys.

Any such reduction in damages could result only from putting more of the rainfall into the reservoir of the soil, thus slowing down the rate of runoff. And this, mathematically, would reduce flood volume downstream, under any and all conditions. Additional measured results are needed from flood-control experience on more streams in order to develop sound estimates on quantitative flood reduction.

PROGRESS BEING MADE IN WATERSHED CONSERVATION

You may be interested in knowing what we are doing now toward accomplishing this job of watershed protection and what we hope to do from here on. In the first place, we are going ahead, at a faster rate each year, with the planning and application of soil and water conservation measures on farms and ranches in soil-conservation districts. In Texas, for example, to July 1, 1951, 94,183 complete farm conservation plans had been prepared by district farmers and ranchers and Soil Conservation Service technicians, covering more than 45 million acres. More than 20 million acres of this planned acreage had been treated for conservation by July 1. Detailed conservation surveys had been made, meanwhile, on about 41 million acres in Texas. These figures are from the records of the Soil Conservation Service. They do not include PMA figures, or those from other Federal, State, or private agencies, except as the activities of these agencies have contributed to the work done with Service assistance on farms in soil conservation districts.

The ground work for upstream flood-prevention work has now been laid; public understanding is well advanced; and a creditable start has been made toward achieving that part of the goal which involves conservation on every acre of land.

The Soil Conservation Service is furnishing technical assistance to the farmers and ranchers in the entire Brazos River watershed in Texas, through the 48 soil conservation districts which are wholly or partially within the basin. There are over 36,000 active conservation plans being carried out by landowners and operators on some 14 million acres in these districts. Some of the accomplishments to date include nearly 3 million acres of contour cultivation, 4 million acres of stubble mulching, 1½ million acres of cover crops, over 5½ million acres of range and pasture improvement including some 2,000 water facilities. In addition, 10,000 farm and ranch ponds have been constructed, together with 70,000 miles of terraces and diversions, and 63,000 acres of farm drainage including 750 miles of open drains. Some 780,000 acres have been treated for improved water application, including about 23,000 acres prepared for irrigation.

On the other hand, there has been a serious lag in getting authority and funds for the complementary upstream engineering work which is so vital to watershed flood protection.

THE JOB AHEAD

We hope that the steps we have taken are leading in the direction of overcoming the lag that now exists in providing watershed protection in the interests of flood prevention, as well as the conservation of soil and water resources on farms and ranches. As we see it, the primary immediate needs are for (1) more technical assistance as well as other facilities, where needed, to speed up the application of soil and water conservation measures to the land, and (2) authorization and facilities to install upstream engineering measures on small watersheds in order to complete the total watershed protection job as a coordinate part of the river basin plan.

In conclusion, let me say that with whatever resources we are provided the Soil Conservation Service will continue to work toward the sound development, conservation, wise use, management, and permanent protection of the Nation's water resources as well as its land. We will do this in cooperation with local, State, and Federal agencies and with any other organizations and groups which have like objectives. In working toward the permanent solution of our water problems, the Service will continue to give full consideration to all beneficial water uses, including those for recreation and wildlife. Also, we will continue to encourage conservation districts and other organizations to use, to the fullest extent practicable, available assistance from all public and private sources.

Such are some of the principles of water control and conservation by which we are being guided in the Soil Conservation Service. Our men throughout the field are acquainted with all these principles, and I am sure you may count on their living up to them to the fullest possible extent. The confidence we have in the ability of the Nation to safeguard our remaining land and water resources is based, to a large degree, on continuing active cooperation with the soil conservation districts. This, plus the positive support of agencies and community leaders like those represented here, who are in a position to help, will expedite the conservation program throughout the country.

We now have the knowledge of how to do the job; the conservation tools have been perfected and tested; we have an organization equipped not only with the necessary technical skills, but with the experience of working with local people—individual farmers, community groups, organized districts and associations, city people, and industries. As a Nation, we have no excuse for not doing the job of conserving our basic soil and water resources; indeed, we dare not shirk it, because our individual and national security, peace, and prosperity depend on it.

Mr. POAGE. Any questions?

Mr. ALBERT. Mr. Merrill, for the sake of the record, what is the present status of the Little River project?

Mr. MERRILL. As the Secretary pointed out a while ago, the Little River report has cleared the Secretary's office, and I understand it has gone to the Bureau of the Budget.

Mr. ALBERT. It is contemplated it will be ready for action by Congress?

Mr. MERRILL. If there is no hold-up I think it should be ready for the next session of Congress.

Mr. ALBERT. How many projects have gone already from the Department of Agriculture for the Southwest and are now pending in Congress or the Bureau of the Budget?

Mr. MERRILL. The Lower Arkansas, Brazos River, Little River, Red River of Texas, Bosque River (and others).

Mr. ALBERT. Do you know that the report of the Washita project is proposed to be submitted to Congress?

Mr. MERRILL. It is scheduled for completion in the fiscal year of 1954.

Mr. ALBERT. Can the agricultural part of that be ready before then?

Mr. MERRILL. I can only speak for the Soil Conservation Service. That part of it can be, can be so far as our initial work is concerned, keeping in mind that what we do must finally be integrated with what others do. The making of the flood surveys in the past—that part of the job would have been completed already.

Mr. ALBERT. In order to get this Little River coordinated—how many watersheds are there in the Little River basin?

Mr. MERRILL. The Leon River is a tributary, and the Little River proper. Really there would probably be as many as 10 or 15 creek watersheds.

Mr. ALBERT. When was the Washita River project authorized?

Mr. MERRILL. It was authorized about 4 years ago.

Mr. ALBERT. How many of those 64 creek units have already had construction work done on them in the Washita?

Mr. MERRILL. About 10 or 15 in some measure or degree. Some have only one detention reservoir, some have four or five. There isn't a single completed one yet. Sandstone is the nearest. That will be the first completed creek.

Mr. ALBERT. When did you start on that?

Mr. MERRILL. We started on Sandstone Creek 2 years ago. Took the entire amount for the last two fiscal years.

Mr. ALBERT. On the basis of money made available in the past it would take at least 20 years to complete that job?

Mr. MERRILL. It would take much longer.

Mr. ALBERT. How much faster could the Washita be done if funds were available for that purpose?

Mr. MERRILL. I would say it would be done just as fast.

Mr. ALBERT. It could be done in 10 years?

Mr. MERRILL. Yes, it could be done in less than 10 years if funds were available.

Mr. ALBERT. Can the farmers do their part?

Mr. MERRILL. We think so. All our estimates are based on the opinion that 60 percent of cooperation. It is a voluntary program.

Mr. ALBERT. If Congress authorized this you probably wouldn't be able to get any funds before the next fiscal year or the one following?

Mr. MERRILL. It would be a long time.

Mr. ALBERT. It could not be done unless the people interested start a movement to increase the funds for those purposes. Is that right?

Mr. MERRILL. That is right.

Mr. POAGE. Thank you very much, Mr. Merrill. In order to help this along, we want to call Mr. Walter Hammond, president of the Texas Farm Bureau Federation.

STATEMENT OF WALTER HAMMOND, PRESIDENT, TEXAS FARM BUREAU FEDERATION

Mr. HAMMOND. Thank you, and members of the committee.

I am indeed glad that this hearing has been held here in Texas, and the most significant feature of this hearing is that you folks, Members of Congress, will take time out from your busy days in Washington to come out here, where the people are who would not have the opportunity to be present in a congressional hearing room. I want to express the appreciation of myself and for all the farmers of Texas for your coming and giving them the opportunity to give their ideas on these matters.

There has been something said about Republicans in this group. I think that there are a lot of people in Texas who have never seen a Republican and would like for you to stand up. I appreciate your standing up. As a matter of fact, there isn't much difference between

Republicans and Democrats, but lots of people in Texas think so. I have never asked a Member of this Congress whether he is a Democrat or Republican. I did not know even which ones here were. I have never had to ask a Member of this Congress whether he was a Republican or Democrat. All the fellows from both sides of the House are just as much interested as others.

I am glad to have been here and to have the opportunity to observe you in action. I know how busy you are and how much effort it took on your part to come. I think it is good for Members from other States to come down to see and observe what agriculture is in Texas.

Mr. POAGE. I know that we are faced with a proposition that always causes complaint; that is, how we are going to take care of all of the witnesses and the order in which they are to appear. Obviously, everybody ought to have his say and be on his way. I don't know what is the fair way to do it; don't know how many are here from a long distance. I think those that have a long way to go ought to have their say and get away. I know there are some from out of the State here.

The next witness is Mr. W. H. Painter.

STATEMENT OF W. H. PAINTER, MEADE, KANS., SECRETARY-TREASURER, CIMARRON RIVER WATERSHED COUNCIL OF SOIL-CONSERVATION DISTRICTS

Mr. PAINTER. I am from Meade, Kans. I am secretary-treasurer of the Cimarron River Watershed Council of Soil-Conservation Districts, and I am representing the watershed of the Cimarron River. That is one reason I am down here from Kansas, representing a watershed that takes in parts of New Mexico, Oklahoma, and Kansas.

(The witness then read and filed a written statement, which is outlined and summarized as follows:)

Especially in the western portion of the watershed water is of profound importance to economic development.

In both western and eastern portions, the reduction of periodic flooding would be a major contribution to the welfare of agriculture.

We are convinced that profound opportunities exist for the development of the Cimarron watershed in many aspects and that many of these opportunities are contingent upon the more efficient use of and control of water.

We are convinced and wish to emphasize that the Cimarron River Watershed Council are agreed that a sound program of flood control must include upstream measures designed to stabilize land and to make efficient use of water in agriculture.

Most of the areas of the watershed is covered by soil-conservation districts, organized and operating under the leadership of landowners who are conscientiously proceeding with the work of the districts.

The educational phases of this program of good land use and treatment, which must precede actual application of the program, have progressed far.

In addition, the Cimarron River Watershed Council wishes to stress the great need for water as a source of water supply for municipalities, industries, and potential irrigation possibilities.

The Cimarron River watershed includes 4 States, 38 counties, or a total of 12,448,000 acres.

Serious floodwater, sedimentation, and erosion damages occur annually in the 19,500-square-mile watershed of the Cimarron River. These damages do not occur uniformly over the watershed because of the wide variation in climate and land conditions.

(The complete statement submitted by Mr. Painter, follows:)

STATEMENT OF W. H. PAINTER, CIMARRON RIVER WATERSHED COUNCIL OF SOIL-CONSERVATION DISTRICTS

Mr. PAINTER. I am W. H. Painter from Meade, Kans., secretary-treasurer of the Cimarron River Watershed Council of Soil-Conservation Districts, and I am representing the watershed of the Cimarron River

The Cimarron River council is interested in any project or program which will contribute to the economic welfare of the people of the Cimarron watershed. The problem of flood control, therefore, is of primary concern to this organization, since its members recognize the many benefits which come directly from and which are incidental to such a program.

We believe that we speak for a vast majority of the residents of the watershed when we point out that a program of water development, which must include flood control, is basic to the orderly development of the entire area, agriculturally, socially, and industrially.

Especially in the western portion of the watershed water is of profound importance to economic development. In most parts it is the limiting factor in agricultural production. Without plentiful supplies of water, industries cannot be established, nor can cities and towns flourish.

In both western and eastern portions, the reduction of periodic flooding would be a major contribution to the welfare of agriculture. We understand that a survey by the Soil Conservation Service of a creek watershed in the eastern portion of the Cimarron area entailing the Cottonwood Creek Basin has shown that agricultural damage amounts to 72 percent of the total flood damage to the entire watershed, and that damage to crops, livestock, and farm buildings averages $67,500 a year. Because land is not used as intensively in the western portion, the annual damage to agriculture in a similar area would not be as great. However, it would amount to a critical sum in the economy of the farmers whose crops and buildings are damaged, and whose livestock are swept away in a single storm. At any rate, the preventive work done upon the watershed in the western portion would be of importance in the reduction of damage in the remainder of the watershed.

We are convinced that profound opportunities exist for the development of the Cimarron watershed in many aspects and that many of these opportunities are contingent upon the more efficient use of and control of water. Large reservoirs for flood control, besides furnishing a buttress against downstream flooding, are useful in the main-stem development of such a stream. They offer opportunities for abundant water in storage which can be utilized for industries and cities, for irrigation and for wildlife and recreation. The council feels it highly desirable to combine flood control, irrigation, and municipal water supply in a single project. We wish to go on record as favoring the construction by the Corps of Engineers of larger dams whereever they may be needed in the orderly development of the basin.

We are convinced and wish to emphasize that the Cimarron River Watershed Council are agreed that a sound program of flood control must include upstream measures designed to stabilize land and to make efficient use of water in agriculture. We have been impressed by the work we have seen carried on by the Department of Agriculture in the Washita River watershed. We realize that land treatment can be useful in the reduction of downstream flood damage and at the same time yield greater returns to the landowners and operators in the upstream areas. We believe that a large percentage of our farmers and ranchers in the Cimarron are aware of the benefits that will accrue from the practice of a good land-treatment program and that these land operators will cooperate to the fullest with the agencies carrying on a program of flood control. In fact, many of these landowners already are practicing the kind of land use and treatment that would be needed in an agricultural flood-control program on the watershed. They are enthusiastic cooperators with their soil-conservation districts and are carrying out soil-conservation plans on the land they own or operate. They are using range- and pasture-conservation practices, soil-improving cover crops, suitable mulching, contour tillage and terracing, and the other practices which put their land to the best and safest use.

We look upon soil-conservation districts as a means of getting this kind of program permanently on the land. Most of the areas of the watershed is covered by soil-conservation districts, organized and operating under the leadership of landowners who are conscientiously proceeding with the work of the districts.

These districts represent a public readiness to go ahead with any program which has for an objective the improvement of the agricultural welfare of the people in the districts.

The fact that four States are interested in a program of flood control for the Cimarron River watershed presents no problem as far as this council and the soil-conservation districts in the watershed are concerned. The educational phases of this program of good land use and treatment, which must precede actual application of the program, have progressed far. We believe that an effective foundation already has been laid for this program, and we are ready to make every further effort necessary to bring an effective program of flood control and water development into being.

In addition, the Cimarron River Watershed Council wishes to stress the great need for water as a source of water supply for municipalities, industries, and potential irrigation possibilities. Oklahoma and Kansas, being in the heart of the Babson Circle, are well situated for attracting industry to the area, in addition to the great expansion program now in effect. From 1939 to 1949 the percentage increase in sale of goods manufactured for Oklahoma and Kansas was 420 percent and 216 percent, respectively. These figures are given as evidence of tremendous expansion of industry that has taken place within the boundries of these two States. Similar figures for Colorado and New Mexico were not available at this writing; nevertheless, it is felt that same will hold true for these States as well.

Promotion of activities for attracting further industrial growth to the Southwest has only begun to take effect; yet, according to the Oklahoma Planning and Resources Board, there are only approximately 12 municipal reservoirs for cities located within the bounds and on the tributaries of the Cimarron River watershed in Oklahoma. Because of the western plains areas through Kansas and upstream on the Cimarron through Colorado into New Mexico, even fewer lakes are found for municipalities, many cities having to resort to wells for their source of water supply Always there is a problem of a lowering water table. With a combination usage of upstream water-conservation practices, detention dams, and reservoirs for flood-control purposes which may be sued by municipalities for irrigation, it is felt that the water table can be kept at a safe level for maximum usage.

As further evidence of need in this respect, we herewith submit more detailed description of facts and principal area envolved. The Cimarron River watershed includes 4 States, 38 counties, or a total of 12,448,000 acres.

The association was organized for the purpose of promoting the application of practices in soil and water conservation and flood control on the Cimarron River watershed.

Serious floodwater, sedimentation, and erosion damages occur annually in the 19,500-square-mile watershed of the Cimarron River. These damages do not occur uniformly over the watershed because of the wide variations in climate and land conditions.

Very few storms cover the entire watershed. In the western portion rainstorms are generally very intense. They usually are of short duration and cover relatively small areas. The storms in the eastern and central portions of the watershed cover larger areas but usually are less intense and of longer duration. Most of the flood-producing storms have occurred in spring or a fall month, with the rain falling during a 3- to 7-day period.

Flooding of tributary valleys by local intense storms is common in the western portion of the watershed. Flooding along the main stem occurs less frequently. However, in the more humid eastern portion, valley flooding occurs on the tributaries and main stem as the result of both local and general storms.

Cottonwood Creek, a Cimarron River tributary in the more humid one-third of the watershed, has a bottom-land area of 13,500 acres which is subject to flooding. About 600 acres of this area is in the urban section of Guthrie, Okla. The annual gross value of crops produced on the flood plain of this tributary is approximately $653,000. Damage to crops, livestock, and farm buildings averages $67,500 a year. Damage to the flood-plain land by scour and sediment deposition amounts to $5,000 annually. Upland damage caused by gully erosion and sedimentation is estimated to average about $11,300 a year. Nonagricultural damage amounts to approximately $32,000 annually.

The agricultural flood damage on Cottonwood Creek, therefore, amounts to 72 percent of the total flood damages.

In other watersheds, for example, we have the Kansas flood of 1951:

1. Floodwater damage to agricultural property	$92,150,000
2. Land damage from deposition, scour, swamping, and stream-bank erosion	9,370,000
3. Reservoir damage by silting to existing reservoirs and partially completed and authorized reservoirs	6,830,000
Total	108,350,000

Damage aros' from combined watershed comprising 93,696 square miles or 59,964,965 acres, or a strip 160 by 525 miles.

Conservation practices alone could be expected to reduce flood and sediment damages 20 to 30 percent. A program which would include special flood-control structures, in addition to the normal program of soil and water conservation on the watershed, would be expected to reduce these damages to 60 to 70 percent.

In the entire Cimarron watershed, the major conservation measures needed in a land-treatment program are stubble mulching on 4,568,000 acres of cropland, annual cover crops on 828,700 acres, green manure crops on 262,150 acres, 104,560 miles of terraces, 2,809 miles of waterways and outlets, 4,500 miles of diversions, and the retirement and reseeding of an estimated 847,600 acres of cropland to permanent pasture.

Other needed land-treatment practices are controlled grazing on 3,915,400 acres of range land, overseeding or sodding 700,200 acres of depleted range, and construction of 1,570 miles of pasture diversions. Drainage is also necessary in certain portions of the watershed, which has a large number of big lakes without any outlet.

Crooked Creek, a tributary of the Cimarron, does not have any definite stream course above Meade, Kans.; therefore, floodwater spreads over the broad, fertile valley, doing a lot of damage every time a rain occurs. Prevention of floods in this Crooked Creek Valley would allow reclamation of countless acres of high-water tableland and back-water lagoons and would afford natural drainage of lands ruined by high-alkali concentrations.

A major benefit from the reduction of flooding and sediment damage would result in the more intensive use of bottom lands which cannot now be cultivated profitably because of frequent flooding. These bottom lands represent some of the most productive land in the area. Experience shows that the reduction of flooding brought about by a watershed-treatment program consisting of conservation measures and floodwater detention structures would pay dividends also through the protection of flood-plains lands and crops now being cultivated.

Mr. POAGE. I think we will take in some of the local people. So I am going to start on the Little River. In the meantime we will try to hear from everybody here. We have this to go through with almost every day in Washington and find we don't have long enough days to get through. Is there anyone here from Milam County? I have a statement filed by the county judge of Bell County, which we will make a part of our record. I have read this statement.

(The statement referred to above is as follows:)

BELTON, TEX., *October 12, 1951.*

Hon. W. R. POAGE,
Chairman, Agriculture Subcommittee, Gatesville, Tex.

While this hearing is primarily for discussion of the agricultural aspects of flood control, the over-all flood-control problem on the Leon River and its tributaries should not be overlooked. The summer of 1951 brought severe, but not unprecedented drought to the area of the Leon and its tributaries, resulting in not only severely reduced agricultural production, but also in restricted water supply for domestic, municipal, industrial, and military use. Completion of the Belton Dam, the Proctor Dam, and such supplementary structures as may be found necessary, along with application of an agricultural flood-control program on the watershed will not only tend to stabilize production on the farm and ranch lands, protect the reservoir from sedimentation, and assist in stabilizing stream flow, but will also give essential flood protection to the thousands of acres of productive bottom lands lying below the Belton Dam.

The Belton Dam has been declared a military necessity, because of providing Fort Hood with its water supply. Approximately one-half of the funds for construction have been made available. Because of the military needs and the great agricultural benefits which will accrue, we respectfully urge the committee to give its enthusiastic support to the provision of funds which will enable completion of the over-all program at the earliest possible date.

Respectfully submitted.

W. A. MESSER,
County Judge, Bell County, Tex.

Mr. POAGE. The next county up the river is Coryell County. This is Judge Robert Brown.

STATEMENT OF ROBERT W. BROWN, ATTORNEY, GATESVILLE, TEX.

Mr. BROWN. Members of the Agricultural Committee, ladies and gentlemen, I am Robert W. Brown, a local attorney here, and I am presenting a brief on behalf of Coryell County, which has been prepared by myself, J. B. Roach, secretary of the Coryell County NFLA, Gatesville, Tex.; W. L. Penny, technician with Hamilton-Coryell County Soil Conservation District No. 506, Gatesville, Tex.; Hon. Jan Clawson, county judge, Coryell County, Tex.; W. P. Graham, county agent, Coryell County, Tex.; Clois Stone, administrative officer PMA, Gatesville, Tex.; Roland Wright, chairman of the board of supervisors of Hamilton-Coryell County Soil Conservation District No. 506, Moshiem, Tex.; and N. Foote, chairman, PMA, Gatesville, Tex.

We give first a history of the land use of Coryell County, Tex., which covers over 100 years of our agriculture and stock raising in Coryell County. Second, we give you briefly the watersheds. Next, we give you the history of the overflows on the Leon River. Fortunately, one of our men on the Leon River was a dairy keeper and several years ago furnished me a copy of this diary, which I give you here, and shows in 1915 there was a flood; 1920, there were two; 1922, there were three; 1923, there were two; 1926, there were three; and in 1927 there was one.

(The witness then read and filed a written statement, which is outlined and summarized as follows:)

History of land use in Coryell County: The first major enterprise was livestock. This gave away to a greater extent to farming—cotton, corn, wheat, oats, and feed crops. In the last 20 years much of the farming land has been abandoned as cropland and is now used for grazing due to the fact that soil erosion and overflows have depleted the land of its topsoil.

Geography of watershed: There are three watersheds: North 8 percent of the county is on watershed of the Middle Bosque; the Cow House Creek runs through the western part of the county and empties into the Leon River; the Leon River, which runs through the central section, is the principal tributary of the Little River.

Frequency of overflow: A tabulation showing overflows from 1919 through 1946, taken from the dairy of Mr. Grundy Ross, of Oglesby, Tex. Dates are given which add up to approximately 55 overflows during that period with variation in frequency. This applies to the Leon River.

Damage from overflows: Number of acres subject to overflow which have never been in cultivation: 5,680. Number of acres once cultivated but not now being cultivated: 11,833. Number of acres subject to overflow that are now being cultivated: 20,398. Total, 37,911.

Damage to overflow land caused by loss of topsoil: These farms were selected at random and we have compiled the following information:

Cotton yield, 5-year average:		
Protected land	pounds	119
Unprotected land	do	92.5
Wheat yield, 10-year average:		
Protected land	bushels	12.6
Unprotected land	do	7.88

Damage from erosion: Based on information from PMA by check of lands suffering erosion damage and land that was protected from erosion, 15,000 acres damaged and reduced in value from $60 to $30 per acre, total, $450,000; approximately $600,000 damage due to weakened springs and loss of water from streams, streams heavily silted, $100,000. Crop produced reduced in yield per acre: cotton, 75 pounds; wheat, 6 bushels; oats, 20 bushels; corn, 10 bushels; feed crops, one-half ton. It is estimated 100,000 acres of land in Coryell County have been damaged $20 per acre due to erosion .

Lowering of underground water table: Water supply of the county comes from three water sands: the paluxy, usually from 50 to 200 feet, which began to fail in 1920 or thereabout, and at this time (1951) practically no new wells being drilled in this sand; the trinity sands, from 450 to 1,100 feet, being soft artesian water, water level in such sands having dropped until now between 75 and 150 feet.

Criticism of present flood-control program: We believe the entire flood-control program should be abandoned, and an entirely new plan should take its place that might correctly be called flood prevention. You cannot any more disregard the soil in controlling a flood than you can the water. If the 20 million of the 30 million being spent on the Belton Dam were spent on upstream control, we believe it would accomplish the same purpose with numerous other enumerated benefits. The reports as to the silting up of Lake Waco reviewed, concluding that the lake at present rate of siltation would be destroyed in 31 years, which could be prevented by upstream control.

Extension and continuation of soil conservation services: We recommend an extension and continuation of the services being rendered by the Soil Conservation Service.

Small dam program: Small dams should be increased in size as the drainage area is increased. Some of the creeks and larger tributaries of the Leon should have a number of dams sufficient to retard the surface runoff and force infiltration.

Large dams: Comanche, Dublin, and Hamilton on the upper watershed of the Leon River are in bad need of municipal water supply and large dams should be constructed and made available but we emphasize that a proper program above these dams would eliminate the necessity for the multi-million-dollar dam.

We restate our recommendations from the divide to the major dam: The first line of defense should begin in the field and pasture; the program should begin on the divide of every watershed; it should include terraces, strip cropping, etc., to increase infiltration; second defense should be to retard and desilt water before it leaves the farm, by stock tanks and small dams; the next defense should be still larger dams; the next should be in creeks or branches; on the Leon River should be some major dams to impound water for municipal purposes and for release for downstream use when needed.

Results to be expected: Floods would be prevented; the basins of lakes would be free from silt; would accomplish upstream underground runoff; underground water table would be raised; rivers and streams would furnish abundance of water year-round; abandoned bottom land would be rehabilitated; the size and cost of large dams downstream could be greatly reduced and the money thus saved could be more effectively spent on the upstream program.

(The complete statement and exhibits submitted by R. W. Brown are as follows:)

FACTUAL DATA—CRITICISM OF PRESENT FLOOD CONTROL PROGRAM AND RECOMMENDATION FOR PROGRAM FOR FLOOD PREVENTION AND SOIL CONSERVATION OF LITTLE RIVER AND ITS PRINCIPAL TRIBUTARY, LEON RIVER

(Presented by Robert W. Brown, attorney, Gatesville, Tex.; J. B. Roach, secretary Coryell NFLA, Gatesville, Tex.; W. L. Penny, SCS technician with Hamilton-Coryell Soil Conservation District No. 506, Gatesville, Tex.; Hon. Jan Clawson, county judge, Coryell County, Gatesville, Tex.; W. P. Graham, county agent, Coryell County, Gatesville, Tex.; Clois Stone, administrative officer PMA, Gatesville, Tex.; Roland Wright, chairman of board of supervisors of Hamilton-Coryell Soil Conservation District No. 506. Moshiem, Tex.; N. Foote, chairman of PMA, Gatesville, Tex., on behalf of Coryell County, Tex.)

HISTORY OF LAND USE OF CORYELL COUNTY

Coryell County was first settled about 1849. The first major enterprise in this section was livestock.

In later years the livestock industry gave away to a greater extent to farming, the principal crops being cotton, corn, wheat, oats, and feed crops. This county is one of the world's largest oat-producing areas and is also extensive diversified farming and livestock section.

In the last 20 years much of the farming land has been abandoned as cropland and is now used for grazing due to the fact that soil erosion and overflows have depleted the land of its topsoil.

If there is any increase in the frequency of the overflows of the rivers and creeks and branches, it is very slight.

GEOGRAPHY OF WATERSHED

Coryell County has three watersheds:

1. The north 8 percent of Coryell County is on the watershed of the Middle Bosque which drains and deposits its silt in Lake Waco.
2. The Cow House Creek which runs through the western part of the county and empties into the Leon River above the Belton Dam.
3. The Leon River which runs through the central section of the county and is the principal tributary of the Little River.

FREQUENCY OF OVERFLOWS

Mr. Grundy Ross, of Oglesby, Tex., the owner of a 210-acre farm on the Leon River 5 miles south of Oglesby, kept an accurate account of the overflows of his farm from 1918 to 1947 and below is a copy of the dates of overflow on his farm which is shown as the most accurate record that we have been able to find:

1919—June 9–12.
1920—August 6–7.
September 7–8.
1922—April 4–5.
April 26–May 4.
May 15–19.
1923—April 15–18.
April 30–May 3.
1926—April 14–15.
April 21–22.
April 24–25.
1927—June 13–14.
1930—October 6–7.
1932—February 19–23.
May 9–18.
1933—May 26–28.
May 30–31.
1934—March 26–27.
April 5–6.
1935—May 5–7.
May 18–19.
June 17–20.
September 26–27.
October 26–27.
November 5–6.
December 6–7.
1936—May 26–31.
September 27–October 5.
1938—January 24–29.
February 18–19.
April 17–18.
July 23–25.
1939—May 17–18.
June 25–27.
1940—November 23–December 1.
December 12–13.

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1941—February 2–8.
February 24–March 1.
March 1–2.
March 6–7.
May 5–19.
June 18–20.
1942—April 13–14.
April 25–28.
April 30–May 1.
May 20–27.
1942—June 7–10.
July 9–14.
October 19–21.
October 23–25.
1944—May 2–3.
May 25–27.
1945—April 4–7.
April 21–24.
1946—March 13–16.

We have been unable to obtain any accurate records as to the frequency of overflow on the Cow House Creek and the other large creeks causing overflow damage in Coryell County, but we believe that the above record would be a reasonable estimate of the overflows on the Cow House Creek and other major creeks.

DAMAGE FROM OVERFLOWS

Source of information

In 1947 the chairman of our committee with the assistance of landowners and agriculture agencies, made a personal farm-to-farm check of every farm touched by the Leon River in Coryell County and compiled the following totals:

1. Number of acres subject to overflow that have never been in cultivation	5,680
2. Number of acres once cultivated but not now being cultivated. Fields having been abandoned because they were heavily seeded with Johnson grass, cut by sloughs, topsoil washed away, etc	11,833
3. Number of acres subject to overflow that are now being cultivated	20,398
Total acres affected	37,911

Up to this time no such survey has been made on the Cow House Creek, Coryell Creek, Dodds Creek, Blue Creek, Plum Creek, Mustang Creek, Bee House Creek, Mesquite Creek, but we believe that the total number of acres of land affected by overflow on the above creeks would exceed the number of acres affected by the accurate survey that was made on the Leon.

DAMAGE TO OVERFLOW LAND CAUSED BY LOSS OF TOPSOIL

It is very difficult to obtain the exact figures as to the amount of damage caused by flood water in Coryell County, as we have no method by which we could obtain the exact information and the amount of damage from flood varies from year to year.

However, we have obtained the following information from the AAA office as to the yield of cotton and wheat on land on the Leon River bottom, part of which is protected by levees and part of which is not protected. The information was obtained in the following manner:

On two large farms in Coryell County protected by a levee, we obtained the average yield of cotton over a 5-year period, and an average yield of wheat over a 10-year period, and then took 10 average farms on the Leon River subject to overflow which were not protected by levees. These farms were selected at random and we have compiled the following information:

Difference in cotton yield on protected and unprotected land

Cotton yield, 5-year average:	*Pounds*
Protected land	119
Unprotected land	92.5
Increased yield on protected land	26.5

Difference in wheat yield on protected and unprotected land

Wheat yield, 10-year average on—	*Bushels*
Protected land	12.6
Unprotected land	7.86
Increased yield on protected land	4.74

The above table shows a damage of 26.5 pounds of cotton per acre per year on the unprotected land and 4.74 bushels of wheat per acre per year on the unprotected land.

In addition to the damage sustained by the reduced yield, which is usually caused by loss of entire crop from an overflow, the owner of the unprotected land also sustains a damage by reason of the increased cost of production due to the land being seeded with Johnson grass and other noxious growth.

On protected land, we have some very fine alfalfa fields, and in the past much of the overflow land was planted in alfalfa. But this crop requires a reseeding every few years and the ground must be prepared like a garden plot before the seeding. On account of Johnson grass and other growth in the fields, the expense of preparing the land for alfalfa on unprotected land has become so great that the growing of the alfalfa crop has been almost entirely abandoned by Coryell County farmers, while at the same time the land is very suitable and highly productive of alfalfa.

DAMAGE FROM EROSION

Source of information

The following information was compiled by the chairman of our committee in cooperation with the PMA (formerly AAA) office by making a careful check of their records and by making comparison of land suffering from erosion damage and of land that was protected from the erosion.

These figures have been corrected to exclude the land now in Fort Hood Reservation and the old Blue Bonnet ordnance plant. But where dollar figures are used, estimates are based on present market value of land.

1. Approximately 15,000 acres of land have been damaged and reduced in value from $60 an acre to $30 an acre due to calliche and other unproductive soil washing from above and being deposited on farm lands and rendering them unsuitable for cultivation. Total, $450,000.

2. Approximately $600,000 damage has been sustained due to weakened springs and loss of water from streams and by livestock being forced to drink stagnant water or the landowners being forced to build and maintain water systems. Total, $600,000.

3. Streams have been heavily silted which has almost completely destroyed the native fish and rendered creeks and rivers undesirable for recreation purposes and causing breeding grounds for mosquitoes. This damage has been estimated at $5 per person per year. Total, $100,000.

4. Crop yields have been greatly reduced on account of erosion and the amount of reduction is estimated as follows:

Crop:		*Reduction in yield per acre*
Cotton	pounds	75
Wheat	bushels	6
Oats	do	20
Corn	do	10
Feed crops	ton	½

5. Approximately 50,000 acres have been abandoned due to erosion and approximately 3,000 acres are being worked at a questionable profit.

6. Soil erosion causes an annual damage to buildings, fences, and private roads estimated at $15,000.

7. Approximately 20 acres of land of the value of $100 an acre is lost annually due to the sloughing of stream banks.

8. Damage sustained due to erosion by pipelines, telephone lines, power lines, and railroads is estimated an annual loss of $10,000.

9. Approximately $40,000 damage is sustained annually due to erosion of Federal, State, and county roads. Total, $40,000.

10. It is estimated that there are approximately 100,000 acres of land in Coryell County that have been damaged $20 per acre due to erosion. Much of this land is now being rehabilitated by the Soil Conservation Service, working in cooperation with the Hamilton-Coryell soil conservation district No. 506, and the PMA program, county agent, commissioner's court, and other agencies.

LOWERING OF UNDERGROUND WATER TABLE

Coryell County's underground water supply largely comes from three underground water sands. The top sand is known as the paluxy which is so near the surface that outcroppings can be seen around the creek and river banks and mountain canyons.

This is a shallow sand usually from 50 to 200 feet below the surface and furnished an abundant supply of good water for both livestock and home use.

About 1920 this sand began to fail to produce and at the present time (1951), practically no new wells are being drilled into this sand as this supply of water is almost completely exhausted..

The second and third sand is known as the trinity sand. These sands can be found from 450 to 1,100 feet. The water is a soft artesian water and up to about 1900 wells drilled into these sands were flowing artesian wells. Since that time the water level of these sands has continually dropped and the water level is now between 75 and 150 feet below the surface and in the last few years, the water table has dropped rapidly and hundreds of landowners have been forced to reach farther beneath the surface to pick up their water.

In support of this information exhibits A and B are attached to the back of this brief.

CRITICISM OF PRESENT FLOOD-CONTROL PROGRAM

We believe that the entire flood-control program should be abandoned, including the use of the words "flood control."

We believe that an entirely new program in plan and in purpose should take its place and that the program might be correctly named "flood prevention."

On a long-time basis we believe that the expenses of preventing a flood would be less than the expenses of controlling a flood after the flood got under way. Up to the present time it seems to have been the practice of the Army engineers and our Members of Congress to regard soil erosion as one problem and flood control as another, but you cannot any more disregard the soil in controlling a flood than you can disregard the water.

Coryell County has never received any benefit from a flood-control program.

We have in the past and are now receiving a very fine work through the farm agencies working with the landowners and they are working on a program to rehabilitate many of our depleted farms and are doing some very fine work in preventing erosion.

Their program now is so universally accepted among our landowners that we cannot find a landowner in our county who does not believe in soil conservation.

We have had many Army engineers and many men from the Reclamation Service that have made surveys through our county but none of them has proposed what we consider a sensible soil-conservation and flood-prevention program.

We regard the construction and expenditures of funds on the Belton Dam as a gross waste of taxpayers' money.

We have no objections to the city of Temple having an ample water supply from the Leon River.

We believe that one-half or one-third of the money expended on this dam would be sufficient to impound all of the water needed by Temple or any other town with 10 times its population, provided a proper upstream program was carried out.

If twenty million of the $30 million being spent on that dam were spent on upstream control, we believe it would go a long way in accomplishing the following additional benefits:

1. Floods on the Leon would be prevented instead of controlled.
2. The basin of the lake would be kept clear of silt instead of filling with silt as it will now do without an upstream program.
3. Ten thousand or more small dams could have been built with $20 million, ranging in cost from $250 to $100,000, that would have stopped surface runoff and impounded the water at or near the point of rainfall and forced an underground runoff and prevented flash floods.
4. It would raise the underground water table throughout the drainage area and start springs to running and make dry wells productive.
5. Leon River, Coryell Creek, Plum Creek, and other major tributaries of the Leon River would run an abundance of clear water the year around and furnish stock water for local farmers and an abundance of fish and wildlife, eliminate stagnant pools and breeding places for mosquitoes, and constantly replenish the Belton Lake with any draw-off that was made from the lake.

6. It would prevent future overflows of our bottom land adjoining the Leon River and the creek tributaries where these landowners could rehabilitate these abandoned farms for crops.

7. It would enable the landowners to make use of many of these bottom farms for alfalfa crops for which purpose they are very adaptable if the floodwaters were controlled.

8. It would materially reduce the area of the lake basin that is to be submerged and prevent thousands of acres of rich farming land being abandoned for use as a reservoir.

9. It would prevent the necessity of building a lake basin with the idea of using a major portion of it over a period of years for the storing of silt and topsoil.

In support of our criticism of constructing a dam without protecting the basin from upstream floodwaters and erosion we cite you as example Lake Waco in an adjoining county, and part of its watershed is in Coryell County.

We quote from Waco Times Herald, May 23, 1946, issue:

"SILT ROBBING WACO'S LAKE—ONE-FOURTH OF CAPACITY LOST NOW BECAUSE OF DEPOSITS OF TOPSOIL FROM WATERSHED OF 1,662 MILES—ANNUAL SILTATION AMOUNTS TO AREA ACRE SQUARE, 66 FEET THICK—CONSERVATION IS THE ONLY REMEDY AVAILABLE

"In 1934 and in 1936 Government engineers came to Waco at the request of the water department to dig into the mud in the city's fast dwindling reservoir. When the engineers completed their studies they reported to the city that every year 66.44 acre-feet of Bosque Valley land was washing into Lake Waco from a watershed of 1,662 square miles.

"The engineers told the city that if conditions of 1936 and the five previous years continued, the rate of fill in the lake would displace the water capacity and that within 31 years—which would be 1969—the original water capacity of the lake would have been lost completely.

"INVESTMENT MENACED

"These figures were discouraging to the city water department which has an investment of $2,058,000 in Lake Waco, the pipeline from the lake, and an addition to the filtration plant which was constructed to handle the lake water. This investment was voted as a bond issue by the citizens of Waco, and at the time the Government estimate of siltage was made, it was figured that by the time last of the bonds and interest had been paid, the lake would have ceased to exist as a reservoir.

"PROOF IS LAID BARE

"Now, for the first time, with the lake level going down to 8 feet below normal, citizens can see for themselves. Huge islands of mud appearing as dry land reveal acres and acres of good Bosque farm and ranch land which have come down the river and have banked up behind the dam.

"LAKE TAKES BURDEN

"Lake Waco watershed includes parts of McLennan, Coryell, Bosque, Hamilton, Erath, and Somervell Counties."

From Waco Times Terald, November 8, 1948, issue:

"BOSQUE DAM IS INCLUDED—DECISION DUE IN JANUARY ON $100,000,000 PROJECT

"Wacoans will await with much interest a decision expected by the Board of Engineers for Rivers and Harbors in Washington, probably in January, on a $100,590,000 program of flood control for the Brazos River watershed, including a new dam on the Bosque to replace Lake Waco."

Aerial photos of Lake Waco taken at the time the water level was dropped a few feet show great beds of silt deposits rising above the water.

The Army engineers' plan of building multi-million-dollar dams of huge concrete structures that are so constructed that they should last a thousand years or more and yet they create a lake basin which, if unprotected by an upstream program, will fill in 33 years. The life of the dam and the life of the basin is so out of proportion as to make their engineering feat a folly.

OUR RECOMMENDATIONS

We do not feel that we would be justified in making criticisms of the present flood-control program unless we felt we were offering a program that would correct the abuses and errors that have been made.

Neither should we praise the work done by the Soil Conservation Service and the local soil-conservation district, the PMA program, the county agent, and other agencies working with the landowners and lose sight of the unfinished work that they have before them.

Our recommendation would cover a continuation of the services being rendered to our landowners by the Soil Conservation Service in cooperation with the Hamilton-Coryell soil-conservation district and also by the PMA program, the county agent, the Farmers' Home Administration, the commissioner's court, and other cooperating agencies.

These programs have been very effective and have accomplished some very fine work of a permanent nature which will go a long way to effect a complete soil- and water-conservation program from the standpoint of the individual farm.

Some of these programs and the results being accomplished by them are as follows:

LAND-USE PROGRAM

Our landowners are becoming increasingly conscious of the words "land use." Proper land use is now the objective of the National Department of Agriculture as well as our local soil-conservation districts.

The technicians of the Soil Conservation Service, in cooperation with the soil-conservation districts and other cooperating agencies, are taking into consideration the type, texture, and chemical contents of the soil, the soil deficiencies that can be replaced and soil deficiencies that cannot be replaced, the climate, moisture, the length of the growing season, the contour of the land, and other factors that enter into proper land use, and are working out their program from a proper evaluation of these factors.

SOIL EROSION

The Soil Conservation Service, working with the Hamilton-Coryell soil-conservation district, the PMA, and the county agent, are and have been for a number of years carrying on a very satisfactory soil-conservation program in Coryell County.

Over 60 percent of all of the farms in Coryell County are carrying on some type of soil-conservation program. About 50 percent are signed cooperators. Most of these are carrying on one or more soil-conservation practices and have planned other practices which will be put into effect on their farms in the future.

At the present time over 150 of these farms have completed their farm plan. Under the recent law effective last June, 222 noncooperative landowners sought help in making plans for soil-conservation practices, and approximately 98 percent of these landowners later signed up on one or more conservation practices.

We know of no landowner in the county that is opposed to soil conservation, and they are almost 100 percent in favor of a soil- and water-conservation program from the individual farm standpoint.

WATER INFILTRATION

Our Soil Conservation Service in cooperation with the local soil-conservation district have brought out some very interesting facts in reference to the water infiltration into the soil which is highly desirable from three standpoints:

(*a*) Water is stored in the soil for growing crops.

(*b*) It stops surface runoff and prevents erosion.

(*c*) It creates underground runoff which raises the underground water table and supplies wells and springs.

Many of our landowners claim that this water infiltration into the soil is greatly increased by the use of vetch and other cover crops and makes the soil more absorbent and capable of holding a greater amount of rainfall.

Prior to 1945 very little vetch, clover, and other cover crops were planted on our farms; but since that time experiments have been made in the use of madrid clover, vetch, and hubam clover and other cover crops; and the results have been so satisfactory that this practice has continuously increased until at the present time we have about 8,000 acres of cover crops of various kinds.

These cover crops have greatly increased the water infiltration into the soil, and in support of these claims we attach letters from individual farmers giving their experience in such practices. (See exhibits C, D, E, and F.)

In the last 10 years the landowners in Coryell County, through assistance of the PMA program and other cooperating farm agencies, have constructed over 2,000 miles of terraces and 526 stock tanks.

Eight out of the ten years they could and would have built more terraces and more tanks if the money had been available; and, if the funds had been available at the proper time, it is our estimate that the miles of terraces constructed and stock tanks constructed would be double the above figures.

This work constitutes a major contribution to the soil and water conservation at the farm level. However, a great deal of work of this type is yet to be done in order to complete the individual farm program.

EXTENSION AND CONTINUATION OF SOIL-CONSERVATION SERVICES

We recommend an extension and continuation of the services being rendered by the Soil Conservation Service through cooperation with the local soil-conservation district and through the PMA program, the county agent, the commissioners court, the Farmers Home Administration, and other coooperating agencies until this service is brought to every farm in Coryell County.

SMALL-DAM PROGRAM

No program for the conservation of the soil nor the prevention of floods nor the impounding of water for municipal purposes or electrical power or other purposes can be effective without a small-dam program.

The stock tanks that have been constructed through the PMA program not only serve the purpose for stock water but also make a valuable contribution to soil conservation and underground runoff, but small farm dams, larger than the stock-tank type, are essential on most of our farms for a flood-prevention program.

These small dams should be increased in size as the drainage area is increased. Some of the creeks and larger tributaries of the Leon should have a number of dams sufficient to retard the surface runoff and force infiltration and underground runoff.

LARGE DAMS

We are conscious of the fact that the towns of Comanche, Dublin, and Hamilton on the upper watershed of the Leon River are in bad need of a municipal water supply and large dams should be constructed and made available for their use, but in this connection we again emphasize that a proper program on a watershed above these dams would eliminate the necessity for the multi-million-dollar dam, as a much smaller dam and less expensive one would serve the purpose and a greater portion of the cost could be paid for by the sale of water, by proper upstream treatment of the drainage area.

WE RESTATE OUR RECOMMENDATIONS FROM THE DIVIDE TO THE MAJOR DAM

1. The first line of defense for soil conservation and flood prevention should begin in the field and pasture where the water falls.
2. The program should begin on the divide of every watershed.
3. The program should include terraces, strip cropping, and the use of cover crops to increase water infiltration into the soil and other proven field practices.
4. The second line of defense should be to retard and desilt water before it leaves the farm on which it falls, such as the present practice requiring stock tanks and small farm dams to be protected by heavy turf of grass in order to desilt the water before it passes into the basin of the tank or dam.
5. The next line of defense should be still larger dams than the stock-tank dams where the drainage area is too large for a small stock-tank dam.
6. The next line of defense should be in the creeks or branches that have still a larger drainage area, and the dam should be in keeping with the area drained and sufficient to impound and retard the flow of surface water.
7. Some of the larger creeks of the county, such as Cow House Creek, Coryell Creek, and Plum Creek, having a drainage area of several miles in length should have still larger dams in keeping with the drainage area.
8. On the Leon River there should be some major dams sufficient in size to impound water for municipal purposes and with sufficient storage capacity where water might be released for downstream use if needed.

We do not believe that an effective soil-conservation or flood-prevention program could be carried out or made effective unless each of the enumerated recommendations have been carried out in their sequence.

RESULTS TO BE EXPECTED

If the above recommendations were carried out we believe that the following benefits would be effected:

1. Floods would be prevented.
2. The basins of the lakes would be free from silt.
3. We would accomplish an upstream underground runoff.
4. The underground water table would be raised.
5. The rivers and creeks would furnish an abundance of clear water the year around. Fish would become abundant and mosquitoes' breeding places would be eliminated.
6. Floods would be eliminated and abandoned bottom land could be rehabilitated.
7. Alfalfa crops would become one of our leading crops.
8. It would materially reduce the area of lake basins to be submerged and prevent thousands of acres of farm lands being abandoned for use as a reservoir.
9. The size and cost of large dams downstream could be greatly reduced and the money thus saved could be more effectively spent on the upstream program.

EXHIBIT A

GATESVILLE, TEX., *October 10, 1951.*

To Whom It May Concern:

I, J. M. Adams, a well driller in Coryell County for the past 20 years, do hereby certify that from 1942 to the present date I have entered some 460 wells for the purpose of cleaning out and deepening them and have found the water table to have dropped about 20 to 30 feet over this period.

Over this same period I have drilled some 900 new wells and have encountered less seepage water and natural veins of water usually found in the Glen Rose lime and Paluxy strata. Drilling to a paying amount of water has caused deeper wells to be developed by going through the above-mentioned strata and going into the first and second Trinity sands. I have found the first Trinity consistently less profitable as to abundance of water, causing in many instances the necessity of going deeper to the second Trinity.

In my opinion the first and second Trinity sands will continue to produce less water because of more commercial and domestic wells being developed to that depth. The shallow water has been, in my opinion, exhausted due to drought and rapid surface runoff when rains do occur.

Wells that have produced 6 to 7 gallons per minute at completion at a depth of about 220 to 300 feet have in the last 5 years, when reentered, dropped about 2 to 5 gallons per minute of former production. Other wells, such as ones drilled in 1935 to a depth of 220 to 250 feet and reentered and cleaned out in 1940 and 1950, have dropped in production from 4 to 5 gallons per minute to 2 and less gallons per minute. The majority of these wells are near Gatesville, and that stratum of water is more often tapped by domestic users. However, the fact remains that the former inexhaustible supply is being rapidly exhausted.

These statements have been made after study and review of logged recordings of findings over the period mentioned herein and are, to the best of my knowledge, true and correct.

Respectfully yours,

J. M. ADAMS, *Driller.*

EXHIBIT B

GATESVILLE, TEX., *October 10, 1951.*

To Whom It May Concern:

The Water Department, city of Gatesville, does periodically make capacity tests of its water wells and does hereby make the following information available:

Tests made by Mr. R. W. Sundstrom, A. H. E., United States Geological Survey, 302 West Fifteenth Street, Austin, Tex., show that from 1939 to 1951 the capacity of the city water wells have decreased, the pressure in each well has been lessened, and the city wells which originally flowed now have to be pumped.

The water level has decreased 20 percent from original showing at the time of development and completion of the wells and continues to fall with increased consumption and development of deepened wells that originally furnished water from strata above the Trinity sand.

Respectfully submitted.

OTHA JOHNSON,
Water Superintendent, City of Gatesville.

EXHIBIT C

OCTOBER 12, 1951.

To Congressional Agricultural Hearing at Gatesville, Tex.

GENTLEMEN: It is my fundamental belief that erosion should be stopped on the land where the water falls insofar as possible.

It appears to me that in the black-land section this can be materially accomplished by the use of biennial legumes, such as madrid and evergreen clovers.

In 1947 I planted a tract of approximately 3-percent slope land to madrid clover. Since that time the terraces on this block of land have not run except in the fall of 1950, when we received 7½ inches of rainfall in approximately 8 hours, and ran approximately the same amount which untreated land would with a 2-inch rain. This block of land had madrid clover on it these 3 years continuously.

In an adjoining field, which had been terraced but on which there had been no clover, all of the terraces broke and much silt was washed out into the pasture.

I again state that the fundamental problem of soil and water conservation is holding the water as nearly as possible where it falls.

N. FOOTE.

EXHIBIT D

HOUSE AGRICULTURE COMMITTEE,
Gatesville, Tex.:

I am Cecil Dixon. I own 526 acres of land on Coryell Creek. In 1947 I worked out a conservation farm plan with the Hamilton-Coryell Soil Conservation District.

I have cleared practically all the cedar off of my place and have sown over 1,000 pounds of grass seed.

Before I cut my cedar and sowed my grass, I had a farm tank that would fill up every time we got a ½-inch rain. After my grass had gotten established, we have had several 3- or 4-inch rains, but owing to grass I couldn't get any water in my tank.

Last year I had the Soil Conservation Service engineers working with the district run a diversion terrace to pick up more water for my tank. This diversion picked up another small draw. The first draw drained some 30 acres, and the draw I had deferred, about 40 acres. This diversion was built about July 1950. The diversion helped, but I still haven't caught a third of a tank of water.

Yours truly,

CECIL DIXON.

EXHIBIT E

GATESVILLE, TEX., *October 10, 1951.*

HOUSE AGRICULTURE COMMITTEE,
Gatesville, Tex.

GENTLEMEN: For 30 years I have owned and operated a 450-acre farm located 3 miles northeast of Gatesville. This unit consists of 320 acres of cropland and 130 acres of pasture land. During the early 1920's I was the first farm owner to terrace cropland. Since that time I have developed a complete soil- and water-conservation program on the entire acreage. Furthermore, I have used and advocated to others the use of legumes, fertilizers, and adapted grasses.

Through the use of various legumes and grasses on terraced land, cut-over pasture, and the use of earthen dams, diversion ditches, and terraces, I have eliminated the erosion and water problem on my unit. I am convinced that by holding the water on the land as it fell and controlling its runoff it has be-

come an asset rather than a liability. Rainfall was utilized through the use of proper terraces, ditches, small earthen dams, legumes, and adapted grasses, and I feel that other landowners could control their flood and erosion hazards through the same facilities. I want it to be known that someone or some agency had to furnish the know-how and at least a part of the financial cost. The Soil Conservation Service and the PMA does that phase of work, and I feel that they should be strengthened and enlarged.

The soil-conservation district set-up is most important in that the district establishes groups of farmers and plans for them a somewhat similiar conservation plan as now exists on my unit. If the entire watershed in all districts were treated as is my unit, I feel that the erosion and flood-control programs as they are developed would be more effective. The silting and loss of topsoil could be controlled in any watershed area, and the water and soil would be retained in its present locality.

At present our conservation district represents democratic home control, and to me that is more effective and sensible than providing for large downstream dams that will in 20 to 40 years be silted into uselessness.

I have followed what I thought to be good land utilization and realize that my unit has increased in productive value and desirability and at the same time I have helped protect my neighbors' farms from water hazards.

I know that this farm will be handed down to my children in better condition than when my father left it to me.

Proper local erosion control will be less expensive and more effective.

Yours truly,

SAM J. POWELL.

EXHIBIT F

OGLESBY, TEX., *October 8, 1951.*

HOUSE AGRICULTURE COMMITTEE,
Washington, D. C.

DEAR SIRS: I am a farmer in Coryell County, farming approximately 1,700 acres of land, 500 or 600 acres of this land being subject to overflow by the Leon River and Station Creek. About 500 acres of this land will be lost to what is known as the Belton Dam. I have seen Station Creek put the Leon River out of its banks. After this last 6-inch rain 2 or 3 weeks ago, Station Creek got next to the biggest it has been in 40 or 45 years. This stopped Temple from having shortage of water. It filled their water dam and ran over.

Some 8 or 10 miles upstream is Coryell Creek. In 1936 and 1937 Coryell Creek put the Leon River on the biggest rise I have ever seen on my place.

I would like to see a big dam on the main channel of the river upstream from Gatesville. Through our district soil conservation we can plant legumes and grasses and terrace watersheds. They know the local conditions over two or three county areas and have talked and discussed with farmers. They have done a wonderful work in the district in terracing and waterways, but we need several dams through the district to put on creeks like Coryell and Station that will back up water from flash floods. These dams can be controlled where silt can be kept out of larger dams, and it will help hold water and silt higher where it will do more good to produce grasses and food on little streams, but we will need Federal help for this.

Any assistance by your department in this would be greatly appreciated.

Yours very truly,

F. A. MORRIS, Jr.

Mr. POAGE. I think the expression from the audience shows how well your paper was prepared and presented. I think that is one of the best I have heard for some time. Personally, I was impressed most by the statement that it is best to prevent floods than to control them. That is, I think, the main distinction of the agricultural program. I think you were present and heard the statement that the Agriculture Department for a long time was not consulted about these programs. When most of the large programs were presented to Congress that was before Congress had established any agency for agricultural flood control. I feel sure I speak for the committee. Do any of you gentlemen want to question him?

Mr. GATHINGS. I would like to add to what you said. It is one of the most thorough presentations we have ever had before this committee.

Mr. POAGE. In considering any of these programs one of the most serious things is, how much of the cost of the program should be borne by the Government and how much should be borne by the local communities and individuals.

Mr. BROWN. I think that most of the program that is on the farm, that is, soil-conservation programs, have been earned by the farmers under PMA. I think they would be glad to carry that on. After the water leaves his farm it is no longer his. I believe the farmers should cooperate in a big way in carrying on water control on his own farm and desilting the water that is on his own land. I think those further on down should bear the major portion of that part of it.

Mr. POAGE. A lot of the difficulty is in apportioning it; like how much cost the State should bear and how much the communities should bear. What about the right-of-way for these smaller reservoirs? They would not all be on one man's land. Should the landowners be required to contribute the area for the small dams?

Mr. BROWN. That might be uncomfortable for the man that might have a pinch on his draw because it might cover up a good part of a man's farm in the interest of somebody else. That would have to be on the basis of the community rather than on the particular individual on whose land the dam would be. It would have to be as a drainage area. This dam down here at Belton will cost $300,000,000. I believe from the information I got this morning about the Washita dams that the cost of dams on some of these farms would be much less than what I thought. In other words, I believe what the Government has spent on these lower dams would be sufficient to control those dams up above. There would be no need of that upper one-half of that dam. There wouldn't be any flood down there because it wouldn't get through there.

Mr. POAGE. I feel we can't be that optimistic about that. Where you see the Leon River has cut a course through this county and a channel that is probably 200 feet lower, and I know this river cut that out, and there must have been floods on this river before any white men ever came to this country. I know that some of our earlier settlers tell about floods. Not that we can't check them. I believe we can do a great deal to check it. I don't believe we can stop floods. Here in central Texas, and especially in the area above the Balcones fault, which includes this county, I think the weather reports show great extremes in weather. It is doubtful you could stop or check all of that.

Mr. BROWN. You could not, unless on some of these creeks like Dodds Creek had a major dam on it. Sometimes Dodds Creek will flood the Leon River out of banks. Of course, those heavy rains usually don't fall at the same time over the same area.

Mr. POAGE. About once every 10 years it would get over all the areas?

Mr. BROWN. Yes. The worst floods are when you get the river full from above and when the crest of the flood is here.

Mr. POAGE. The records show that the Little River carried by Cameron one time more water than ever came down the Mississippi above Alton, Ill. I think that is the place to start your flood-control work, where the first erosion starts. I know it will go a long way, and I don't know how far but I think it is worth working on.

Mr. BROWN. I want to thank you on behalf of our people here. We feel sure the Secretary of Agriculture and you gentlemen understand our problems and from the words we have heard we believe you are in sympathy with us.

Mr. POAGE. We still have some long-distance visitors here. I believe we have one gentleman from Arkansas.

Mr. ALBERT. We have two groups here from Oklahoma. Another group from lower Red River.

Mr. POAGE. The next witness is Mr. R. C. Longmire, of the Oklahoma Water Conservation Association.

STATEMENT OF R. C. LONGMIRE, REPRESENTING THE OKLAHOMA WATER CONSERVATION ASSOCIATION

Mr. LONGMIRE. I am R. C. Longmire, of Pauls Valley, Okla., was born 40 years ago on the banks of the Washita River. My family has owned and operated several hundred acres of farms in the Washita Valley for nearly a half century. I have been a supervisor in our local soil-conservation district for over 13 years.

At this time, I would like to present some photographs of the Washita River, as it may be seen today in the vicinity of Pauls Valley. Until 10 years ago the Washita had a very definite and stable channel, with steep banks bordered with huge trees. This channel was seldom over 200 feet in width with rich farm lands on either side. Today, as you can see from the pictures, the stream bed has filled with sedimentation and the trees have fallen into the river, with the result: a meandering channel across sand flats with the stream bed in many places one-fourth of a mile in width and thousands of acres of this country's most productive land lost for all time.

Under these present conditions it is estimated that average flood damage amounts to $5,700,000 annually in the Washita watershed. The city of Pauls Valley and Garvin County alone sustained a $5,000,000 loss in the flood of May 10–11, 1949.

As president of the Washita Flood Control Council, composed of the supervisors of 22 soil-conservation districts, together with businessmen and farmers of the Washita watershed, we would like to recommend a program of flood control consisting of 2 parts: (1) Land treatment measures; (2) detention reservoirs.

The land-treatment measures include terraces and field diversions; cover cropping; strip cropping; contour cultivation; seeding and fencing grassland and other conservation practices.

Completion of this land-treatment program alone would reduce annual flood damages by approximately 30 percent.

Small detention reservoirs and related works, such as floodwater diversions, drop inlet structures for gully control, floodways and channel improvement in subwatersheds have been found to be very effective in reducing flood damages. The extent of the need for such structures has already been determined for a number of tributary subwatersheds in the development of work plans. On this basis, it is estimated that the structural works needed for the entire Washita River watershed will include approximately 650 detention reservoirs, 200 miles of floodwater diversions, 420 drop inlet structures, and 90 miles of floodways. The estimated cost of these works is approximately $41,500,000.

The drainage areas above the 650 detention reservoirs would include 3,085 square miles, or almost 40 percent of the entire watershed. The structures would have a total detention capacity of approximately 960,000 acre-feet, or an average of 6 inches of runoff from all the drainage area above these structures. Only 5 percent of the tributary flood plain area would be inundated by the permanent pools of the floodwater retarding structures. Of this land only one-third is now cultivated. The drainage areas of the individual structures usually vary from 2 to 10 square miles. The detention pools are designed to hold back at least the maximum runoff to be expected once in 25 years, and the spillways are designed for the maximum flood of 100-year frequency occurring when the detention pool is filled. Floodwater is released through automatic draw-down tubes, usually at a rate of flow the channel below the structure will carry without damage of flooding.

These structural measures alone would reduce average annual floodwater and sediment damages by approximately 43 percent.

The land treatment measures and upstream flood-control measures, installed together by subwatersheds as is now being done, would, when completed over the entire Washita River watershed, reduce the total floodwater and sediment damages by an estimated 73 percent.

The people of the Washita watershed believe that an upstream flood-control program as outlined, is the answer to our flood problems. At the last meeting of the Washita Flood Control Council a resolution was passed to request of Congress sufficient funds to complete this program with a 10-year period.

We know that this idea of upstream flood control is new, we know that it will work as evidenced in the projects completed within the past 3 years. The finished structures have worked admirably during rains of 10 to 15 inches in 36 to 48 hours. We on the Washita wish to speed this program of flood control along as a model for other watersheds in the Plains country. It is our aim to divide and conquer, by keeping every raindrop where it falls, never allowing too much water to get in one place. Small structures keep large amounts of water from getting together, thereby reducing floods.

This is the flood-control program the people of the Washita want.

I want to thank you gentlemen for this privilege of a few moments of your time. We on the Washita think that we have one of the greatest programs for flood control ever conceived by the mind of man. It was said awhile ago that we had floods before the white men ever came. We know we had floods on the Washita. We know that is how the rich bottoms on the river were built, by floods. We still think, and think we have figures to prove it, that we can reduce those floods by 75 percent. As Mr. Merrill, I believe, told you, the work consists of three parts. We of the Washita only want the first part, land treatment and reservoirs. This flood-control council on the Washita is composed of 22 water-conservation districts. I am happy to say that between 35 and 40 members, everyone, everyone in the Washita watershed, are members and supporters of our organization. Some of our people have become discouraged. We are not. Our program was authorized in 1944. We started immediately on land-treatment programs. The last few years we had structures and detention reservoirs built. We regretted that our appropriations were cut this year. We know that you gentlemen have nothing to do with that proposition.

A MEMBER. I think when this came up, every member on the committee tried to prevent this reduction.

Mr. LONGMIRE. I believe the members of this committee from their actions and their actions today are for us 100 percent.

Mr. POAGE. May I suggest to you that we expect tomorrow to go up through your area. The fame of the work there has spread a long way. This committee believes that seeing activities is worth just as much as hearing about activities and in many cases a great deal more.

Mr. LONGMIRE. I would like to show you some of this work and some of the flood damage the first thing.

Mr. POAGE. The next witness is Mr. L. L. Males.

STATEMENT OF L. L. MALES, CHEYENNE, OKLA.

Mr. MALES. I am L. L. Males, from Cheyenne, Okla. I live in a small town adjoining the watershed, for which Mr. Merrill told you the appropriation has been spent for 2 years. I want to tell what the farmers and small-business men think of it. That is, we like it. There is no disturbance to our population or customers except our income has increased. We can take that. On this little watershed of 65,000 acres, there will be 37 detention reservoirs and more gulley blocks. The water falls on the fields and we try to keep all of it there that we can. Then we try to control it in little reservoirs and then in the channel. We know this can be done because we have seen it tried on Barnett Creek. Below the detention reservoir there was no flooding. That is flood control. Now, what we are pleading for is more money. We have been fortunate where I live in that we got this first money, but we want everybody to get this. We want to see every stream in the Nation get it. We know this builds the local community. This is a farmer and small-town program. I don't know how the cities like it. They will like it if they understand it. You don't find a farmer that knows what it is that isn't up in arms for it. I thank you.

(The complete statement of L. L. Males is as follows:)

SANDSTONE CREEK WATERSHED

I appear before you to give you the impressions of an ordinary businessman of a small town in whose trade territory we have an agricultural flood control project, and where we depend entirely on agriculture for a livelihood.

There are many good things about the agricultural flood control program, but to me the principal reason I am so strong for it is that it helps all our people earn a better living. This program not only helps the people in the flood plain downstream but it helps everyone living on the watershed from the very top to the month of the Mississippi.

To explain this statement, let me show you what the agricultural flood control plan is doing for the Sandstone Creek watershed in our trade territory.

This watershed contains 65,000 acres of land, 4,700 acres of bottom land and 60,300 acres upland. The upland has 9,000 acres in cultivation, including good and bad, and 51,300 acres range land. So you see we do not have much good land in our country and we must save what little we have for the production of crops and especially hay which we must have to winter our livestock. Thirty-three percent of this bottom land cannot now be used for cultivation because of the frequent flooding, as we have an average of three damaging floods a year. Over the past 20 years this flood damage has averaged $58,697 a year.

To remedy this condition the following action was undertaken and is now nearing completion:

Seeding 5,800 acres idle or retired formerly cultivated land to grass.

Built 433 miles of terrances.

Built 125 farm ponds.

Secured improved crop rotations on 6,200 acres.
Secured improved range and pasture management on 58,800 acres.
Built 17 miles diversion terraces, vegetative waterways, fencing, etc.
Also built: 24 detention reservoirs, 17 drop inlet structures, 1 mile of channel improvement, 1.3 miles floodwater diversion.

These detention reservoirs have a draw-down pipe which permits the water to start leaving the reservoir when when it reaches a certain level. This is called the permanent pool level and if water comes in more rapidly than the pipe will discharge it forms the flood pool; and if more water continues to come in it is discharged through the spillway. The reservoirs on this project are so constructed that they will contain runoff of from 5.18 inches up to 7.91 inches, varying with the reservoir.

All of these reservoirs except two are either completed, under construction, or under contract.

When completed these reservoirs will cover in permanent pool only 139 acres of bottom land or 3 percent of the 4,700 acres and only 63 acres will lie within the flood pools, while at the same time 1,551 acres of bottom land will be restored to cultivation and only 110 acres of the bottom land will be subject to average annual flooding.

Thirty-eight of the fifty-nine floods, such as occurred during the 20-year period from 1920 to 1939, will be prevented. The remaining will be reduced to minor floods causing an average annual damage of $1,236 as compared to the present $58,697 average damage.

The conservation practices will increase the yield of crops and proper range management will give us more pounds of beef and diary products. This range land as it is restored to proper condition will absorb up to 2 inches of rainfall in 30 minutes. Nearly half of this range is now restored to good or excellent condition.

Now you can see why businessmen and farmers in small communities are so strong for this agricultural flood control program when we once learn what it does. We can live and support our institutions with this kind of program, and there is no big disturbance in our population or customers except their income is increased.

Yes. There is a cost to this program like all others. This program is estimated to cost the farmers $195,046, the Government $1,229,280, and the State and county $62,510, which makes an annual cost of $53,943. But at the same time the reduction in flood damages is $57,461. The gain by more intensive land use due to protection is $11,019 and the conservation benefits are $88,039, making a total annual benefit of $156,519, or $2.90 per dollar of cost, without claiming any benefits on the Washita proper.

In our own minds we know this program will work because we have seen it tried on a size we understand. A detention reservoir on the Barnitz watershed absorbed a rain of 13 inches in 5 hours, did not flood below, and discharged for 2½ days through pipe. This is holding the water the nearest to where it falls, so we cannot see how it can be wrong. In short we are 100 percent for this type program and would like very much to see it in operation on all the Washita Valley and on all other streams in this Nation of ours. We will then have flood control and it will benefit everybody.

Mr. POAGE. The next witness is Mr. Floyd Roberts.

STATEMENT OF FLOYD ROBERTS, JR., HOLLIS, OKLA.

Mr. ROBERTS. I represent the Soil and Water Control Council of Texas and Oklahoma Upper Red River Watershed. I will just give you a little history and then file my report. The area is about 9½ million acres and about 8½ million in cultivation, made up, the organization is of soil conservation supervisors in 20 districts in the upper Red Rver watershed in Oklahoma and Texas.

(The statement referred to was filed with the record and may be summarized as follows:)

Description of area: The area is about 19,500,000 acres in Oklahoma and Texas. The flood plain is 575,000 acres in extent. Floods occur on an average of three times a year. Damage averages $4,700,000 a year. This flood damage involves the destruction of crops, roads, bridges, livestock, and homes.

Erosion: Soil erosion is the most important problem facing the economy of the upper Red River Basin. We would like to urge the Department of Agriculture to complete surveys of soil, slope, and erosion condition in order to determine the proper use of our land.

Sedimentation: Is one of the greatest damage which is done by floods. This damage is generally done by uncontrolled soil erosion. The beds of the major streams contribute heavily to sedimentation of large reservoirs and to silt deposits on lower bottom land. The Altus Reservoir was 98 percent silted in 16 years.

Water conservation: Most of the towns and cities in this basin are faceing a water shortage in some degree. In a lot of istances it is acute. An inventory should be made of all water supplies, both surface and ground water. This survey should include both quality and annual yield.

Roads: Road drainage for the most part is uncontrolled. We feel that the road problem should be integrated with the other soil and water problems in the area.

Recommendations: We believe that soil and water conservation should be carried on as one of the first parts in any flood-control program. (1) Soil and water conservation on private lands based on correct land use, plus necessary treatments. (2) Multiple purpose structures on small tributaries. (3) Storage of surplus water on larger, well protected watersheds to satisfy the needs of municipalities, industries, irrigation, and recreation. An inventory of soil and water resources is necessary.

(The complete statement submitted by Mr. Roberts is as follows:)

Red River Watershed Above Lake Texhoma

(By Floyd Roberts, Jr., of Hollis, Okla., Secretary of the Soil and Water Control Council of Texas and Oklahoma Upper Red River Watershed)

The Soil and Water Control Council of Texas and Oklahoma Upper Red River Watershed is an organization made up of soil conservation district supervisors in 20 districts on the upper Red River watershed in Oklahoma and Texas.

DESCRIPTION OF AREA

The area of the Red River watershed above Lake Texhoma is about 19,500,000 acres in Oklahoma and Texas. Land in cultivation runs more than 8,500,000 acres.

The flood plain is 575,000 acres in extent. Much of it is highly developed agriculturally, especially on the Oklahoma tributaries. Floods occur on an average of three times a year.

Flood damage in the area averages $4,700,000 a year. Sedimentation damages amount to $300,000 a year on the average, making a total average damage of $5,000,000 per year.

This flood damage involves the destruction of crops, roads, bridges, livestock, and homes. During the year 1950, the floods in Oklahoma cost the lives of 2 people, 1,250 people were temporarily homeless, 24 homes were destroyed and 67 others were badly damaged. More than 29,000,000 tons of soil were lost, and bank cutting, scouring, and deposit of sediment damaged fertile bottom lands.

EROSION

Since good soil is the first essential of agriculture, soil erosion is the most important problem facing the economy of the upper Red River Basin. Erosion is severe on a large portion of the cultivated land of the watershed due to unwise use of the land. The greatest opportunity of expansion and development of the area lies in increasing the per-acre production of agricultural lands. The future security of all business in this area lies in a land-use program that will insure permanent high production.

We would like to urge the Department of Agriculture to complete surveys of soil, slope, and erosion condition in order to determine the proper use of our land. This information will determine irrigable land, cropland, range land and areas needing immediate attention. It will, also, assist in locating the most prominent flood and silt source areas.

SEDIMENTATION

Sedimentation is one of the greatest damage which is done by floods. It is prevalent in this area and can be detected on bottom lands, highways, reservoirs, and some of the urban areas. This damage is generally done by uncontrolled soil erosion. The beds of the major streams contribute heavily to sedimentation of large reservoirs and to silt deposits on lower bottom land. The problem of reservoir sedimentation on the North Fork in Oklahoma is not new. The Altus Reservoir with a capacity of 13,100 acre-feet was 98 percent silted in 16 years.

A more recent survey made of sedimentation on the new Altus-Lugert Reservoir silting is occurring at the rate of 1,076 acre-feet per year. At this rate of siltation, 27 percent of its capacity will be depleted in 40 years, or at the end of the repayment period. However, if the conservation practices are not applied on the watershed at a more rapid rate, the rate of siltation can be expected to be more than doubled in that period.

WATER CONSERVATION

Conservation and proper use of water resources are second only to conservation and proper use of the soil resources. Rainfall averages 20 to 28 inches per year. In order to keep high production, it is necessary to use as much as possible of this amount of water where it falls, and to supplement it wherever possible with irrigation or spreading of surface runoff from other land.

Most of the towns and cities in this basin are facing a water shortage in some degree. In a lot of instances this shortage is acute. It should be possible to trap large watersheds for water supplies, and it will be profitable to treat the land to use all the water possible where it falls.

An inventory should be made of all water supplies, both surface and ground water. This survey should include both quality and annual yield.

ROADS

A major problem exists on maintenance of county roads, mail and school bus routes not now included in the State and Federal highway system. Most of the present bridges and culverts are inadequate and in need of replacement or major repairs. Road drainage, for the most part, is uncontrolled. It causes much damage to these roads, making them impassable at times and hazardous to traffic at all times. Roads are heavy contributors to sediment damage. We feel that the road problem should be integrated with the other soil and water problems in the area.

RECOMMENDATIONS

We believe that a soil and water conservation program should be carried on as one of the first parts in any flood control program. The people in this watershed believe that a program should be initiated which is similar to the one being carried on now on the Washita River in Oklahoma.

It should include—

1. Soil and water conservation on private lands based on correct land use, plus necessary treatments.

This will include seeding of about 1,000,000 acres of eroded land which is not suitable for cultivation to permanent grass and a seeding of another 1,000,000 acres to alfalfa or grass in rotation with cash crops on land that is terraced and contour farmed.

It will also include improvement of range conditions on 11,000,000 acres of grassland and treatment of 40,000 acres of badly gullied land.

2. Multiple-purpose structures on small tributaries.

This will include upstream detention structures, floodwater diversions, drop inlet structures on roads.

3. Storage of surplus water on larger, well protected watersheds to satisfy the needs of municipalities, industries, irrigation, and recreation.

An inventory of soil and water resources is a necessity of sound planning of these three programs.

We believe that such a program will help greatly in solving our flood-control problem. There should be no delay in getting started on it.

Mr. POAGE. The next witness is Mr. George P. O'Neil.

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STATEMENT OF GEORGE P. O'NEIL, HUGO, OKLA.

Mr. O'NEIL. Mr. Chairman, ladies and gentlemen, I am from Hugo, Okla. I represent the Southeastern Oklahoma Red River Water Area Council. This area consists of about 11 soil-conservation districts. Unfortunately, we are at the foot of the mountains and in an area in which we have about six streams that are hard to control that give us lots of flood damage.

I have been a citizen there for 47 years and before Statehood I saw it, the soil go away. We had at one time in our county a production of from 30,000 to 35,000 bales of cotton per year and more food than we could use. Today we are producing from about 3,000 to 4,000 to 6,000 bales per year. Our Congressman here can tell you that we have lost in population due to that fact.

Now, there is no reason for a fellow like me trying to sell you boys on a soil-conservation program, but if we can aid you in any way in selling the others in Congress on our urgent need. Our people are going to California too fast for us and especially in southeastern Oklahoma where all of these floods are getting our land and getting our people, and we would like to see a strong effort made to stop it. I had the privilege of helping organize this council. We made about 25 meetings all over the area. Our people are sold on these soil-conservation and water-control programs and if the other boys from the cities and the East would realize our necessity, and get a larger appropriation for this program, I believe we could get it sooner. We can't wait 50 years in southeastern Oklahoma and have much population left.

I would like to file a report from this soil district, and we pray that we can get some earlier action in our district, because I don't believe any part of Oklahoma or the Nation is losing soil as we are.

(The report referred to above is as follows:)

SOUTHEASTERN OKLAHOMA RED RIVER WATERSHED
COUNCIL OF SOIL CONSERVATION DISTRICTS,
Hugo, Okla.

We of southeastern Oklahoma, representing the Lower Red River Council of Soil Conservation Districts, wish to present statements and recommendations to your honorable committee on agricultural flood control.

Control or reduction of flooding is probably the most serious need in the field of water development in southeast Oklahoma. Frequent flooding has prevented the development of thousands of acres of good bottom land which would be of great value for agricultural production. More than 350,000 acres of this land, some of it with a high productive potential, are subject to flooding so frequently that cultivation is not profitable. Bank caving along Red River below Denison Dam is an increasing problem.

It is the opinion of the Lower Red River Watershed Council of Soil Conservation Districts that the reduction of flood damages on this affected area would be highly profitable to the owners and operators of agricultural land in this watershed and that such a project also would be worth while on the basis of increased Federal tax revenues and a more dependable agriculture.

Many of us have seen the work that has been done on Mill Creek in the watershed of the Washita River in Oklahoma and we are impressed with the obvious effectiveness of the program in protecting land and reducing other flood damage. We are aware of the many other benefits that are the result of putting conservation practices on agricultural land, and we believe that land treatment in the area we represent is far enough advanced to make possible the beginning of a flood-control program without great delay.

We believe the gap between soil and water conservation work on farms directed by soil conservation districts and assisted by the Soil Conservation Service and the field of the Corps of Engineers should be bridged by the agricultural flood-control program.

We believe the most efficient and economical way of determining what works of improvement are needed and justifiable is by studying the entire watershed of each creek of the main stream. When the watershed condition, the extent of flooding, and the cost of the average annual flood damages have been learned it will be possible to determine what land treatment measures and practices are needed. This will assure the right types, sizes, and locations of structures to reduce floodwater and sediment damages; and to evaluate the expected costs and benefits of the proposed work.

We recommend planning and carrying out operations by entire creek watersheds:

1. To assure that adequate consideration is given to all possible combinations of structures and measures to reduce flood damages on all lands not protected by the Corps of Engineers' program, so that the plan selected will produce the maximum reduction of flood damages at a favorable ratio of benefits to costs.

2. To locate structures so as to give maximum protection to flood plain lands, utilizing the most favorable sites to the maximum capacity needed. This will make it possible to keep the number and size of structures, and the area inundated by them, to the minimum consistent with adequate flood protection.

3. To increase the efficiency and reduce the cost of planning. Also, the need and justification for certain possible structures on the branches cannot be determined until the watershed of the entire creek has been investigated.

4. To make it possible to work more effectively with groups of farmers in the land-treatment program which must precede the installation of structures for the reduction of floodwater and sediment damages. A large work area facilitates locating and working with neighbor groups and utilizing local leadership. It is better suited for the organization of a district or association under State law for the mainteiance of structures, if this should be needed.

5. To reduce operations costs. If work is concentrated in larger watersheds, operations can be administered more efficiently and the cost of providing technical assistance will be less. Also, larger construction contracts can be let at one time, thereby reducing unit costs.

6. To facilitate coordination of the work of the Soil Conservation Service with that of the Corps of Engineers so that flood protection will be provided to as much of the bottom lands as is feasible.

We are in hearty sympathy with the representatives of the Washita River, the Cimarron, the upper Red River, and other councils in their pleas for action in their respective watersheds. The areas they represent are in effect companion problems to ours. The application of this program in the watersheds of the Washita and the upper Red River can directly affect the welfare of this part of the Red River watershed below Lake Texhoma.

We realize that an effective flood-control program on all these watersheds will be a tremendous undertaking. However, much preparatory work already has been done. The people of the Red River watershed in southeast Oklahoma are ready to give their majority support to such a program. We will charge the damage that already has been done, not to carelessness and lack of concern, but to a lack of understanding of the needs of the land.

We are late in beginning our fight against further damage to our good land. We ought to lose no more time.

S. V. HACKWORTH.
President.
MARIE BRADSHAW,
Secretary.

Mr. POAGE. The next witness is Mr. R. S. Rainwater.

STATEMENT OF R. S. RAINWATER, PRESIDENT, ARKANSAS ASSOCIATION OF SOIL CONSERVATION DISTRICTS

Mr. RAINWATER. You have been talking about me all afternoon. We had too much in my section in June and July, but coming down here from Arkansas to Texas I believe I would be more appreciated down here than in Arkansas. I want to take this opportunity to express to this group of distinguished Members of Congress here—I am here to talk for the farmers of Arkansas—and I want to express our appreciation to you gentlemen for the knowledge and understand-

ing you have of this over-all program. I am going to carry back to our supervisors in Arkansas a message of hope, a message of encouragement, because I know the position that you fellows take. I realize the importance of this great work, and we want to express to you our appreciation of the splendid work you are doing.

I want to say that soil and water are the two basic things on which life depends. I want to say that I think any amount of money spent by Congress on this will pay back in increased income, and I think America is too rich to allow her soil to be wasted and I feel that the same is in safe hands in this Congress and our present Secretary of Agriculture.

(The witness then read and filed his brief, which may be summarized as follows:)

As president of the Arkansas Association of Soil Conservation District Supervisors, I would place the greater emphasis upon the watershed treatment phases of the Government's flood-control program. I believe we must have our protective structures on the main stems as well as on the watersheds.

However, I want to place greatest emphasis on the agricultural benefits that are to be realized from a coordinated flood-control program. The Soil Conservation Services officials have told me that nearly 85 percent of the annual flood damages on this system is agricultural.

I want to point out that I consider the treatment of land in an agricultural flood-control program at once the foundation of flood control and an investment that benefits society in general. The system has already been tested.

Drainage of agricultural land is another important problem in Arkansas. It goes hand in hand with flood control. Investigation shows drainage improvement is needed and is practical on almost 4,000,000 acres of land in the Arkansas-Red-White River Basins.

Most farmers who need improved drainage in this State are ready and financially able to do the necessary work on their farms, but they need help. We can't get the water off our land until there is a place for it to go.

I have learned that about 200,000 acres of land in eastern and southern Arkansas are now under irrigation. A large percentage of this land is used for growing rice. Much of the water is pumped from wells that are showing a decline. The normal flow of surface streams is usually lowest at the time it is most needed for irrigation.

(The complete statement submitted by R. S. Rainwater is as follows:)

STATEMENT OF R. S. RAINWATER, PRESIDENT, ARKANSAS ASSOCIATION OF SOIL CONSERVATION DISTRICTS

As a farmer, a businessman and a citizen of Arkansas I welcome this opportunity to express my interest in what I consider one of the most needed and most profitable investments that can be made to improve the economy of a people. I refer to the efforts of our Government to reduce the damages caused almost every year by the uncontrolled flooding of streams.

Officially, however, I want to speak in behalf of the farmers of Arkansas, especially those represented by the organization of which I am president—the Arkansas Association of Soil Conservation District Supervisors.

Naturally, representing a group primarily concerned with the wise use and proper treatment of agricultural land, I would place the greater emphasis in this statement upon the watershed-treatment phases of the Government's flood-control program. However, I am well aware of the need for the program of the Army engineers in building large downstream structures which take up where the upstream program leaves off in providing a buttress against the movement of great volumes of water down major stream channels. I realize—and I believe, that I speak for a large majority of the members of my organization—that if we ever are to have adequate protection against floodwater damage, we must have our protective structures on the main stems as well as on the watersheds. I recognize too that there are additional benefits from the building of large downstream structures.

However, I want to place greatest emphasis on the agricultural benefits that are to be realized from a coordinated flood-control program. I asked the Soil Conservation Service for its estimate on the amount of agricultural damage shown by its survey on the lower Arkansas and its tributaries. The Soil Conservation Service officials have told me that nearly 85 percent of the annual flood damages on this system is agricultural. As a farmer, with a part of my cropland in a flood plain, I understand well what the cost of a flood can be to a farmer: Destroyed crops, damaged buildings and fences, drowned livestock, soil gone forever, good bottom land ruined by layers of sand washed down from farms above. As a banker I know the cost of such losses to these men in dollars and cents.

As a farmer and a spokesman for other farmers, I want to point out that I consider the treatment of land in an agricultural flood-control program at once the foundation of flood control and an investment that benefits society in general. This system has already been tested, as on the Washita River watershed in Oklahoma, and its effectiveness is an established fact.

I want to point out briefly that I consider the drainage of agricultural land another important problem in Arkansas. It is a problem that goes hand-in-hand with the matter of flood control, and while we are providing for one we would be short-sighted indeed if we did not provide for the other.

Investigation made by the Soil Conservation Service shows that drainage improvement is needed and that it is practical on almost 4,000,000 acres of land in the Arkansas-White-Red River Basins in Arkansas. When adequate flood protection is provided along these rivers and their major tributaries in Arkansas the drainage of an additional 1,500,000 acres of land now frequently flooded will be feasible.

I want to emphasize that most farmers who need improved drainage in this State are ready and financially able to do the necessary work on their farms. But they need help. In many places, channel and major drainage improvements are needed for adequate drainage outlets for large areas. In other words, we can't get the water off much of our land until there is a place for it to go. If the main outlets are adequate, or if they have been made so, we need engineering assistance in designing, laying out and constructing good farm drainage systems.

I have learned that about 200,000 acres of land in eastern and southern Arkansas are now under irrigation. A large percentage of this land is used for growing rice. However, much of the water used for irrigation is pumped from wells which are showing a decline in capacity or are requiring greater lifts. In many of the wells, both of these conditions exist.

Several thousand acres of this irrigated land are being put in row crops and pasture, a development of the past 2 or 3 years. This, I believe, is only the beginning of this kind of irrigation in Arkansas, but this development depends on whether suitable supplies of water can be made available in drought periods. The normal flow of surface streams is usually lowest at the time it is most needed for irrigation.

The control and storage of floodwaters could not only meet this increasing demand but it also would alleviate the demand now being made on ground water supplies.

It is my sincere hope that as a result of this congressional committee hearing an urgent plea will be placed before the Congress to authorize for these streams a flood-control and drainage-improvement program that will give our farmers the opportunity to develop and make the best use of all their productive land.

(Mr. Tom T. Moore, Jr., filed the following statement:)

LOUISIANA ASSOCIATION OF SOIL CONSERVATION DISTRICT SUPERVISORS,
Hosston, La., October 11, 1951.

Hon. W. ROBERT POAGE,
Chairman, Flood Control Committee,
House of Representatives, Washington, D. C.

DEAR SIR: At the request of Mr. W. T. Nolin, president of the Louisiana Association of Soil Conservation District Supervisors, I submit the attached brief on agricultural flood control on that portion of Red River below Fulton, Ark.

Very truly yours,

TOM P. MOORE, JR.,
Member, Board of Supervisors,
Upper West Red River Soil Conservation District.

RED RIVER WATERSHED BELOW FULTON, ARK.

Floods in the Red River watershed below Fulton, Ark., take an annual average toll of $7,220,000 in damages. These damaging floods occur on the average of two to five times a year.

In addition, tremendous amounts of topsoil are lost from the uplands through erosion every year. I have been told that conservative Government estimates put this loss at 53,500,000 tons a year. No price tag can be placed on that loss because you can't buy topsoil at any price. It is priceless. The topsoil that we are losing every year is the equivalent of 372 farms of 160 acres each having a layer of topsoil 6 inches deep.

Let us think of these tremendous losses for a moment: every year these floods are costing us more than $7 million. Every year we are losing enough topsoil to make 372 quarter-section farms. This annual toll is sapping our natural resources. These losses are not only tremendous; they are shameful. Shameful because they can be very largely prevented. We can't afford to postpone this preventative work any longer. With the whole world tottering on the brink of another war, it would be the height of tragic folly to permit these losses to continue, to let our productive soil, on which our existence depends, wash away. To do nothing would be to invite national disaster; to stop these annual losses would help insure our future as a nation.

The Red River watershed below Fulton, Ark., contains 10,000,000 acres of land. About 1,500,000 acres are in the highly developed Blackland of Texas. About 7,150,000 acres are in the timbered coastal plain country of east Texas, Louisiana, and Arkansas. About 1,350,000 acres are in the flood plain of the Red River in Arkansas and Louisiana.

Crop and idle land of this area occupies about 3,150,000 acres, pasture about 2,040,000 acres, woods 4,440,000 acres. Miscellaneous use accounts for 400,000 acres.

Rainfall is high in the watershed of the Red River below Fulton. It varies from an annual average of 38 inches in the upper reaches of Sulphur River to nearly 60 inches where the Red enters the Mississippi. Often rainfall exceeds the annual average by 50 percent or more. Torrential rainfall, a common occurrence, causes floods that cover thousands of acres.

The main tributaries of this part of the Red River are Sulphur River, Cypress Creek, Bodcau Bayou, and Dorcheat Bayou. Hundreds of smaller streams enter these tributaries, many enter the Red River as direct drainage.

Floodwater damage occurs not only on the main stem of the Red River, but also on the major tributaries entering it and on the many smaller streams found in the watershed. In many cases the flood plain of the small stream is more developed agriculturally than the major tributary flood plain.

It is important to remember where the flood damage occurs.

First, on the main stem of the Red River. It is the responsibility of the Corps of Engineers, Department of the Army, to protect this area from flooding.

Second, on the major tributaries of the Red River. Here the two departments of the Government responsible for flood control work together. Generally speaking, the Corps of Engineers operates in the lower reaches of the large tributaries, and the Department of Agriculture in the upper reaches.

Third, on the many hundred small streams which run into the major tributaries and the main stem of the Red River. Treatment of these small streams is the responsibility of the Department of Agriculture working through the Soil Conservation Service and the Forest Service.

In the flood plains of the major tributaries of the Red River below Fulton are 340,000 acres that are subject to flooding. Of this acreage, 119,000 acres are in cultivation, according to a report compiled by the United States engineers.

Damaging floods on these major tributaries occur on the average two to five times a year. These floods damage crops every year on the average to the extent of $960,000. They damage other property to the extent of $154,000. Here again my information comes from a report by the United States engineers.

Yearly flood damage on the main stem of the Red River adds up to $600,000 to crops and $330,000 to other property.

In the flood plains small streams and minor tributaries are 1,021,000 acres that are subject to flooding. Of this acreage 115,000 acres are in crops, 324,000 acres in pasture, and 582,000 acres in woodland.

Floods occur on these small streams and minor tributaries three times a year on the average. The average flood damage of these small streams totals $5 million a year. That includes crop, pasture, and other agricultural damage.

You will note that damage on the small streams is greater than the combined damage on the major tributaries and main stem. There are three main reasons for this: The flood plains of the small streams are highly developed agriculturally, floods occur frequently, and there is little or no flood protection in the form of levees or other safeguards.

Because of these facts, we cannot escape the conclusion that treatment to protect the flood plains of the small streams is absolutely necessary.

To continue the listing of flood damages:

Damage to roads, bridges and, other public services in the flood plains of the small streams is estimated conservatively at $70,000 annually. Of course, damage repairs show up in local taxes.

Floodwaters wash away large amounts of productive soil from the bottom lands yearly. I am informed that 1,000 acres are damaged every year from scour. A nominal value of $25,000 is placed on this annual damage.

I have already referred to the shameful loss of 53,500,000 tons of topsoil a year from erosion on the uplands.

When water removes soil from the uplands by erosion or the bottom land by scour and takes it downstream, the soil must be deposited somewhere along the line or carried all the way to the Gulf of Mexico. Unfortunately a large part of the transported soil, or silt, is deposited before it reaches the Gulf. It covers fertile bottom lands and piles up in lakes and reservoirs—reservoirs, I might add, that are built at great public and private expense.

Specialists who have studied this problem estimate that the deposit of silt causes at least $6,000 in annual damage to bottom lands and $75,000 to reservoirs. Reservoirs in the Louisiana portion of the Red River watershed alone are filling up at the rate of 540 acre-feet annually.

These damage figures all add up to the $7¼ million total listed earlier.

In the whole Red River watershed below Fulton there are about 3,150,000 acres of cropland. Of that total only about 245,000 acres can be maintained properly through the use of good cropland practices. This is our best land, and there is precious little of it left. About 1,285,000 acres require moderate conservation practices to be maintained in permanent crop use. A large part of this land was once in the better class but soil-depleting and other poor farming practices have damaged it permanently. About a million acres of the cropland require intensive conservation practices for proper maintenance.

This is our good, sloping hill land from which soil is easily washed unless it is protected. About 120,000 acres of the land now cultivated or idle should be kept in close-growing crops or converted to pasture. This is our eroded hill land that used to be classed as good but has been damaged permanently by poor agricultural practices and failure to protect the soil from erosion. About half a million acres of cropland are too eroded or too steep to keep in cultivation at all. This is our worn-out hill land. About 400,000 acres of this land should be put into permanent pasture and the other 100,000 acres planted to trees.

In addition to existing and planned large reservoirs, levees, and other engineering works on the Red River below Fulton, the following things are needed to slow down runoff, help prevent soil erosion, and increase the ability of the soil to take in and hold rainfall:

(1) Conversion of 400,000 acres of eroded and unproductive cropland and idle land to permanent pasture.

(2) Improvement of 2,000,000 acres of existing grassland to improve the cover and provide better forage for livestock.

(3) Planting of trees on 100,000 acres of land too poor or too eroded to support crops or pasture.

(4) Improved fire-protection systems for 4,440,000 acres of woodland.
(5) Improvement and proper management of 4,440,000 acres of woodland.
(6) Treatment of all cultivated land in accordance with its needs and capabilities. This includes crop rotations that use soil-improving crops, terracing, proper terrace outlets, field diversions, and gully stabilization.
(7) Grade-stabilizing structures.
(8) Upstream structures to retard floodwaters.
(9) Channel straightening and stream-bank improvement.
(10) Drainage of 700,000 acres of wet land suitable for cultivation if drained.
(11) Improvement and development of small irrigation systems.
(12) Roadside gully control.

It is evident that soil and water cannot be separated in plans to control floods. It is also evident that any flood-control plan must cover a whole watershed if it is to be most effective.

The above facts lead to these conclusions:

1. That a complete survey or inventory should be made of our soil and water resources and the relationship of the two. It seems beyond argument that the Federal Government is the only body capable of making such a survey or inventory. But it is my belief that the Federal Government ought to and probably would be glad to work with State agencies and local people in a position to be of help.

2. That any plan for the control of floods should include, as an integral part of the general scheme, treatment of the land. It is a proved fact that much of our present flood problem starts out on the land, our farm land. The rain beats down on bare land, loosens the soil and washes it away. If we could hold the rain where it first falls, or at least some of it, we would be taking one of the steps necessary to control floods. So let's start our control system out there where the problem starts—out on the land. Let's get our land protected. Let's fix it up so that it has something on it to soften the blow of rain and something in it that the rain can soak into instead of running off, taking the soil with it.

3. That we should proceed on all watersheds on which land treatment and reservoir construction work has been authorized and that such work on additional watersheds be authorized as quickly as necessary plans can be drawn up. This it not time to "economize" on such undertakings that mean so much to our basic resources, soil and water; to our over-all economy; and to our national security. To hesitate now on the ground of economy would be a perfect and tragic example of penny pinching.

4. That the Corps of Engineers; the Soil Conservation Service; the Forest Service; and other agencies, Federal, State, and local, should be encouraged to continue their flood-control work with the cooperative unity that now marks their efforts and that the work they are now engaged on be speeded up and work on additional watersheds be undertaken as soon as practical.

5. That the present system of land treatment should be continued and expanded whereby soil conservation districts, composed of local landowners and operators themselves, take an important part in the work of soil and water conservation.

Mr. POAGE. Here is the national president of the Soil Conservation Districts of the United States, Mr. Waters Davis.

STATEMENT OF WATERS DAVIS, NATIONAL PRESIDENT, SOIL CONSERVATION DISTRICTS OF THE UNITED STATES

Mr. DAVIS. I thank you very much. Much to your relief I do not have a prepared statement. When Mr. Hope was the chairman of this committee I had the privilege of traveling 1,500 miles to Washington and back and had 1 minute of time before the committee. Give me 2 minutes this time.

I have been very much interested in hearing all this testimony and particularly I have been interested in the questions that the committee asked. I believe this committee, especially the members here today, are thinking just as we in the soil-conservation districts are thinking—that is, this entire problem of the land is the problem of

the people who own and work that land—and I would like to get it in the record that the people who own and are working the land are doing it in a practical way by conservation districts. As long as the people of America are free they can only do this work in a voluntary way.

I would like for the record to remind you that the soil-conservation districts are legal units set up in every State, and they are the people, and the Soil Conservation Service is the people. I thank you very much.

Mr. POAGE. We want to get back to the Little River.

The next witness is Mr. Dale Hardin.

STATEMENT OF DALE HARDIN, COUNTY JUDGE, ERATH COUNTY, TEX.

Mr. HARDIN. I am the county judge of Erath County, Tex. I will not take up over about 1 minute of your time. I would like to say a few words in regard to the Bosque River watershed. Erath is in two districts. The Bosque is a major tributary of the Brazos River. We are familiar with the survey report made by the Soil Conservation Service in August 1950 to the Secretary of Agriculture, and we understand this was submitted to the Bureau of the Budget in January of this year. We would like to urge this committee to do everything possible to submit this report to the Congress at the next session, and that same be authorized by the committee, and that work commence as soon as possible.

Mr. POAGE. If there is anyone from Comanche County we would be glad to hear. I have a brief filed by the Dublin Chamber of Commerce and by the Upper Leon Conservation District. I regret it is not physically possible to hear everybody at the same time and it is often impossible for all those who want to be heard to stay through a hearing. We run into this same thing every time we have a hearing. I understand you still have a considerable group from Brown and Mills County here. We will be delighted to hear from Hamilton County, because it is one of the most involved in this program.

(The statements referred to above are as follows:)

DUBLIN CHAMBER OF COMMERCE,
Dublin, Tex., October 12, 1951.

To: Upper Leon Soil Conservation District.

Because of the general farmer cooperation with the soil-conservation program of this area, which is practically 100 percent, and the consequent noticeable improvements in general farming conditions brought about by such past cooperation; and

In view of the serious need to control erosion and floods on the upper watersheds and along the small drainage in the Upper Leon Soil Conservation District; and

In view of the need to control flooding of agricultural land of the drainage area before damage occurs, and thus reducing floodwater damages and preventing silt within larger reservoirs below; and

Because such a program would help complete the soil- and water-conservation program, much of which has already been accomplished; and

Because the accrued benefits would be several times the costs of flood-control application, we the Dublin Luncheon Club and the Dublin Chamber of Commerce recommend the Department of Agriculture flood-control program, now assigned to the soil-conservation district program for flood control in an improved watershed for this purpose. We endorse this program because of the economic

benefits to this community as a whole, which has accrued through sound conservation practices in the past, and which we know will accrue to the community by and through this program.

T. C. GRANBERRY,
President, Dublin Luncheon Club.
WALKER WHITFIELD,
President, Dublin Chamber of Commerce.

On the Leon River below the Proctor Dam site, there is a considerable amount of land that is poorly drained and swampy, because of the restricted stream channels. The valuation of property benefited and the average annual damages are high for this area. The Leon River is subject to destructive floods, which destroy cultivated crops on some of the best land in this section of Texas. Intermittently, there has been a considerable amount of pollution in the Leon River, which has destroyed the game fish and which has affected the water supply of the city of Temple. Chemical pollution has at times retarded or destroyed improved pecan orchards which are particularly adapted to the Leon River area.

The Leon River from the Proctor Dam site to the mouth includes 37,735 acres cultivated land, 16,343 grazing land, 5 miles of urban land; the total of 54,983 acres. The value of property in 1949 was $8,017,790, the damages from maximum flood of records $5,132,576. It is believed damages equivalent to those estimated to the maximum flood of records would be repeated on an average of once in 9 years on the North Fork of the Leon River. Screen gaging records are available for making analysis

The people of the central Texas area are interested in the Proctor Dam on the Leon River because of the resulting benefits from the following: Fish and wildlife conservation, flood control, water conservation, land reclamation, municipal and industrial use of water, irrigation, and recreation.

Due to the short notice about this meeting, we were unable to prepare a more exhaustive discussion of the above subjects. We plan to prepare a complete survey of these subjects.

RESOLUTION BY UPPER LEON SOIL CONSERVATION DISTRICT BOARD OF SUPERVISORS

Because of very evident and serious need to control erosion and floods on the upper watersheds and along the small drainages in this small conservation district; and

In view of the immediate need to control flooding of agricultural land of the drainage area before damage occurs, and thus reduce floodwater damages and prevent siltation within larger reservoirs below; and

Because such a program carried out would assist in completing the soil and water conservation job which is so vital to the stability, development, and future welfare of our Nation; and

Because the accrued benefits would be several times the cost of flood control application;

We, the board of supervisors of the Upper Leon Soil Conservation District, endorse and recommend the Department of Agriculture flood control program now assigned to the Soil Conservation Service for surveys, planning, and application.

We respectfully request that all the territory included in our district be included in an approved watershed for this purpose.

Respectfully submitted.

W. J. FRITTS,
Chairman, Board of Supervisors,
Upper Leon Soil Conservation District.

Mr. POAGE. The next witness is Dr. Charles C. Baker.

STATEMENT OF DR. CHARLES C. BAKER, HAMILTON, TEX.

Mr. BAKER (from Hamilton, Tex.). First, I want to thank the committee. I have a little brief here that I am going to read, which won't take but 3 or 4 minutes. I want to tell you that in Hamilton

County the Soil Conservation Service has been one of the best things we have had in years and years. We have been working on it for years and I feel like we are getting something done. We feel we are right in the middle of this deal, and we heartily agree with Coryell County, and our reports are about the same.

The Army engineers, I understand, have already approved a dam above us and one below us, and that leaves us between them. I have a plan which I submitted to the Army engineers and would like to offer this same plan before the Department of Agriculture. I have a small brief to file [reading]:

Subject: Leon River, Tex. Regarding improvements for flood control and allied purposes for Hamilton County, Tex.

We, the people of Hamilton County, Tex., desire to present data in support of improvements for the control of floods and allied purposes on the upper and middle Leon River watersheds that were not recommended in the report on the Leon River submitted to Congress on April 19, 1946. Belton Dam we are sure, if those methods recommended in that report are put into practice, will leave at least about 250 miles of the Leon River and its tributaries to continue flooding and eroding our present rich valley farms and their adjoining lands.

This acreage in Hamilton County as indicated by the tax rolls, is owned by about 70 landowners, which approximate about 20 percent of our farms and our farm population in our county. This acreage is conceded to be our richest, most productive in the county, year in and year out, if the overflows could be controlled and put to its use.

We can submit under separate cover data from the landowners, owning land on or in the Leon River and its valley of Hamilton County, Tex., based on a period of the past 10 years. This available data is a cross section of the Leon River and its valley of Hamilton County, Tex., only. This data is from about 125 landowners, from the upper, middle, and lower end of our county along this river. Striking an average, with 70 farms as a basis, we find that the valley has approximately 10,920 acres in cultivation, 23,520 acres in timber and grasslands, giving a total of 34,440 acres. The 23,520 acres in timber and grasslands, these farmers state, that approximately 12,320 acres could be farmed which would make the total acres of the Leon River Valley to be cultivated total 22,440 acres, all of this in Hamilton County. From this, using only the present farmed lands, and not including this additional timber and grassland acreage, we find that the approximate loss in productivity and monetary return amounts to $711,083.60. This loss has materially affected the progressiveness of this area and induces a loss of our taxes. These figures do not have the losses from cattle, hogs, sheep, etc., figured with it. Our county agent and soil conservation agency, after checking this data, find our farmers were very conservative in compiling their losses for that period in crops, erosion, personal property damage, stock loss, and even in the total number of floods recorded.

To alleviate this condition we submit this proposal:

That a dam be constructed in Hamilton County, Tex., close to what is known as the Stephenville Bridge across the Leon River on the old Stephenville and Hamilton Road. This dam should be placed so as to take in the water not only from the Leon River but its big tributaries in our county known as Bear Creek, Warrens Creek, Mesquite Creek, and Rocky Creek. These four creeks at flood stage, without the Leon River being at its flood stage, are known to flood the rest of our county more often than the upper river by itself without their aid.

This dam we think would prevent floods from this point to well past the city of Gatesville in Coryell County because there isn't but a few tributaries below this location and they are spaced far enough apart to prevent the floods that these upper ones can do together, because of their proximity.

We propose that this water impounded by this dam be used for the following purposes:

First. For flood control and for soil conservation. Farmers' statements attached to this brief showing their losses etc., and previous reasons stated before.

Second. Source of an ample and good water supply for the city of Hamilton, Tex.

A report from Mayor Brown, representing the City Council of Hamilton, Tex., stating the urgent necessity of a new source of water supply in order to further the health and economic growth of this city is attached to this brief under separate cover.

Third. We find that if this water is impounded at or near this location, at least 7,000 acres or more could be irrigated. This water will be sweet and of low mineral content and if used on our fertile valley land will produce nearly any kind of a crop that can be grown in our climate. Our county agent states that alfalfa, etc., and row crops can be made to triple their yield along this valley if we had irrigation and flood control. Our farmers in the past year have seeded approximately 1,600 acres in alfalfa and hope or brag to get two cuttings a year from it, but if irrigation was used six cuttings would be possible.

According to the farm census report put out by the Department of Commerce, farms are decreasing in size and farm units are increasing in number in our county. This is a trend toward more farm families on fewer acres using intensive and diversified farm methods. By using irrigation, river farms can be really placed on small acreage therefore supporting many times the farm families without decreasing the production or income, but we think will increase both.

Fourth. We understand that in planning such a unit on a river the Government also takes into consideration with it, the conservation of wildlife, fish, and recreational benefits to a locality. We know that in all of the surrounding counties within a radius of 60 miles we have no such benefits and even know that it not only detracts from growth of our own wildlife, but to the advantages of our own well-being. We feel that our section has been overlooked by the Government planning along these lines and feel that we should have a share in these benefits.

To summarize: We believe that we have something that with the Government help, we would not only increase our farm productivity, but will enhance the lives of not only the farmers but of the whole of our county. We think it of sound economic value to us and our Government, to be given flood control, water supply, irrigation to thousands of acres, with the conservation of wildlife, fish, etc., and that the Government could derive a revenue from these sources that would warrant this improvement on the Leon River, Tex., to be done in our county.

Mr. BAKER. We desire to present data in support of improvements for the control of floods on the upper and middle Leon River watersheds. If the methods that have been recommended are put into practice it will leave at least about 250 miles of the Leon River and its tributaries to continue flooding and eroding our present rich valley farms and adjoining lands.

We submit data from about 25 landowners. Striking an average with 70 farms, we find the valley has approximately 10,920 acres in cultivation, 25,520 acres in timber and grasslands, giving a total of 34,440 acres.

We submit this proposal that a dam be constructed in Hamilton County, Tex., close to what is known as the Stephenville Bridge across the Leon River, which should be so placed as to take in the water not only from the Leon but its big tributaries in our county known as Bear Creek, Wahren's Creek, Mesquite Creek, and Rocky Creek. This dam, we think, would prevent floods from this point to well past the city of Gatesville in Coryell County. We propose the water to be impounded be used for: First, flood control and soil conservation; second, source of an ample and good water supply for the city of Hamilton, Tex. There is an urgent necessity for a new water supply; third, at or near this location at least 7,000 acres could be irrigated, and would produce nearly any kind of crop; fourth, the conservation of wildlife, fish, and recreational benefits to the locality. We feel that this section has been overlooked by the Government planning and feel that we should have a share of these benefits. We think our proposal of sound economic value and that the Government could derive revenue from these sources that would warrant this improvement on the Leon River to be done in our county.

Mr. POAGE. I would like to ask one question. I asked Judge Brown the same. How much Federal aid do you think there should be?

Mr. BAKER. I think that one-fourth or better or one-half of the conservation project should be taken care of by our county. I may be wrong, don't know. I have tried to get somebody to give me an estimate of how much to arrive at, because if it takes 50 years for this job to be done, I am for it, because I have some children myself.

Mr. POAGE. Is there anybody else here that wishes to be heard on the Little River or Leon?

Mr. STILES (from Hamilton). How about the Cow House?

Mr. POAGE. That is part of the Little River watershed program. We have the president of the West Texas Chamber of Commerce here.

The next witness is Mr. Fred H. Husbands, of the West Texas Chamber of Commerce.

STATEMENT OF FRED H. HUSBANDS, REPRESENTING WEST TEXAS CHAMBER OF COMMERCE

Mr. HUSBANDS. I have got a statement here which I will file, without reading but a few excerpts from it. I represent an organization of about 6,000 members, from every business enterprise, including agriculture and livestock. We are keenly interested in this program. We have asked the Soil Conservation for a survey. Reservoir construction is extremely important in west Texas, and, as you know, the control of the surface water is one of the greatest and most important things to all of our people. I think the Soil Conservation Service has done a wonderful work, and I think our people are interested in this type of work. I would like to respectfully urge you to inaugurate a policy with reference to holding the water in these reservoirs. And the utilization of that water when it has been stored, I think, would be extremely important to all of our people.

West Texas includes approximately the western half of the Red, Brazos, and Colorado River watersheds, the upper Trinity, and portions of the Pecos and Arkansas watersheds. It is estimated the average annual floodwater and sediment damages in west Texas amount to approximately $18,000,000 to $20,000,000. Sedimentation problems in west Texas range from very serious to negligible and can be correlated with rates of erosion and sediment transportation in the various physiographic areas.

Rates of erosion and extent of sedimentation damages are high in the sandy areas of the West Cross Timbers, Palo Pinto section (Reddish Prairie) and the Redbeds Plains. In the Llano Basin, Edwards Plateau, the Big Bend area, and the High Plains erosion rates and rates of sediment contribution are relatively low.

Most valleys in the west Texas cross timbers belt, including all or parts of Cooke, Denton, Parker, Johnson, Erath, and Comanche Counties, have been deeply buried and extensively damaged by modern deposits of relatively infertile sand ranging from 3 to 15 feet deep, and in many places there are spectacular gully developments.

In most of west Texas surface water from reservoirs is the most important source of municipal, industrial, and agricultural water supply. Many important reservoirs are suffering rapid capacity loss by sedimentation. In the upper Brazos River drainage area alone, 29 reservoirs of importance to the economy of the region are now in operation. These are suffering rates of capacity loss by sedimentation ranging from 3 percent to 4 percent annually. Possum Kingdom

Lake in Palo Pinto County is losing 7,428 acre-feet of capacity anually by sedimentation.

Over a large portion of west Texas floods can be very damaging, but they occur at infrequent intervals. In some watersheds, such as the upper Trinity, Bosque, Little River, middle Colorado floodwater and sediment damages are sufficiently high to justify the installation of structures for runoff and waterflow retardation and sediment control.

I have enjoyed talking to you and thank you very much.

(The complete statement filed by Mr. Husbands is as follows:)

FLOODWATER AND SEDIMENT DAMAGES IN WEST TEXAS

(Presented by Fred H. Husbands, executive vice president and general manager, West Texas Chamber of Commerce)

West Texas includes approximately the western half of the Red, Brazos, and Colorado River watersheds, the upper Trinity and portions of the Pecos and Arkansas River watersheds.

It is estimated that the average annual floodwater and sediment damages in west Texas amount to approximately $18,000,000 to $20,000,000. Of this amount about 75 percent is agricultural. This damage is to crops and pasture; other agricultural items such as buildings, machinery, fencing, etc.; roads and bridges; valley sediment deposition; reservoir sedimentation, and miscellaneous damages. The damage is considerably less in the western and Panhandle portions of the area.

The average annual floodwater and sediment damage on the Texas portion of the Arkansas River watershed is estimated to be $420,000; on the Red River watershed in Texas above Denison it is estimated to be $327,000; and in the Colorado River watershed above and including the middle Colorado it is estimated to be more than $5,000,000. The average annual damage on the Brazos River watershed above Waco, excluding the Bosque River watershed, is estimated to be $1,824,000; on the Bosque, $492,000; and on the Little River down to and including Cowhouse Creek, $2,636,000.

Sedimentation problems in west Texas range from very serious to negligible and can be correlated with rates of erosion and sediment transportation in the various physiographic areas.

Rates of erosion and extent of sedimentation damages are high in the sandy areas of the West Cross Timbers, Palo Pinto section (Reddish Prairie), and the Redbeds Plains. In the Llano Basin, Edwards Plateau, the Big Bend area, and the High Plains, erosion rates and rates of sediment contribution are relatively low.

Most valleys in the West Cross Timbers belt, including all or parts of Cooke, Denton, Parker, Johnson, Erath, and Comanche Counties, have been deeply buried and extensively damaged by modern deposits of relatively infertile sand ranging from 3 to 15 feet deep. Many tributary valleys in the Palo Pinto section (Reddish Prairie) and in the Redbeds Plains have suffered damage by modern sediment deposits. The main source of these deposits is serious, and in many places spectacular, gully development. Another area of relatively high sediment output, much of it sandy, is along the High Plains border where the larger streams are eroding canyons headward into the High Plains formations.

In most of west Texas surface water from reservoirs is the most important source of municipal, industrial, and agricultural water supply. Since transportation and deposition of fine sediment is a major factor, many important reservoirs are suffering rapid capacity loss by sedimentation. In the upper Brazos River drainage area alone, 29 reservoirs of importance to the economy of the region are now in operation. They have a total original capacity of nearly 1 million acre-feet, and the combined cost of construction was nearly $16,000,000. These reservoirs are suffering rates of capacity loss by sedimentation ranging from 0.3 to 4 percent annually. Possum Kingdom Lake in Palo Pinto County is losing 7,428 acre-feet of capacity annually by sedimentation. In the upper Red River drainage area more than 70 reservoirs supply water for cities and towns, industries, irrigation, and recreation, and their rates of capacity loss are comparable to those of the Brazos River area.

Other types of damages, such as channel-bank erosion and flood-plain scour, have caused extensive damages in various segments of valleys.

The problems which must receive attention include:

(1) Erosion of upland areas and the development of gullies both by wind and water.

(2) Sediment deposition on valley lands, in structures, reservoirs, stream channels, and irrigation improvements.

(3) Floodwater damage to crops, land, buildings, urban areas, roads and bridges, utilities, etc.

(4) Stabilization of ground-water supplies.

The excellent work which has been done by the soil-conservation districts which cover most of West Texas have demonstrated that a watershed land-treatment program which includes conservation farming and ranching practices such as cover crops, range management, terracing, conservation crop rotations, and other needed measures goes a long way in controlling erosion and runoff, increasing production, and providing additional income. The benefits to be derived from such a program far outweigh the costs.

Over a large portion of west Texas floods can be very damaging, but they occur at infrequent intervals. In some watersheds, such as the upper Trinity, Bosque, Little River, middle Colorado, floodwater and sediment damages are sufficiently high to justify the installation of structures for runoff and water-flow retardation and sediment control. Water-flow retardation structures, drop-inlet structures, floodway and channel improvements, and related structures are very effective for the purpose of retarding excess runoff and of reducing floodwater and sediment damages to valley lands. Such structures are now being built in the Washita River watershed in Oklahoma and in the upper Trinity and middle Colorado River watersheds in Texas.

Mr. POAGE. Have I overlooked anyone here who wants to present any problem to the committee? This committee proposes to stay here until it hears from everyone that wants to be heard. We don't stop at 5 o'clock in Washington and won't do it here. We will expect to stay until everyone present has an opportunity to present any report. If anyone wants to file any statement, we will be glad to have it. If anyone is here who now feels he would like to prepare a statement, mail it to me and we will see that it is a part of the record, because we don't want to limit anybody.

I want to thank the people of Coryell County and of Gatesville for all of their hospitality and the splendid treatment we have received at your hands. I know it has been a matter of considerable inconvenience for the local people to extend the kind of hospitality that you have. We do appreciate it. I do believe it makes for better government to have Members of Congress meet the people they represent face to face and to really see their problems. Several years ago our committee went over the country, and I only wish there were time enough for the committee to do it every year. There isn't time enough. I trust it will be possible at some time later to visit other parts of the country. I am sure they will not exceed the people of Gatesville in hospitality shown us, and we appreciate it very much.

(The meeting was adjourned.)

(The following statements and briefs were filed with the reporter:)

WILDHORSE CREEK, TRIBUTARY OF WASHITA RIVER

DUNCAN, OKLA., *October 12, 1951.*

HOUSE OF REPRESENTATIVES AGRICULTURAL COMMITTEE,
Washington, D. C.

GENTLEMEN: The directors of Wildhorse Creek Flood Control Association have authorized me to summarize their findings in the following manner regarding the control of floodwaters on the Red and Washita Rivers and particularly insofar as the said flood control affects Wildhorse Creek, a tributary of the Washita River.

We are informed that, to prevent sedimentation of Lake Texoma, dams have been planned at Durwood, Daugherty, and at Hennepin. The high-water line of the Durwood Reservoir would be located approximately 1 mile downstream from the Daugherty Dam. The Daugherty Reservoir would cover approximately 25,000 acres and would inundate some 9 miles of the lower Wildhorse Creek bottom land. From the high-water line of the Daugherty Reservoir to the proposed location of the Hennepin Dam would be approximately 3 miles. The Hennepin Reservoir would cover approximately 8,000 acres and would back the water up the creek bottom some 11 miles.

If the above information is correct, or approximately so, then an estimated 33,000 acres of some of the best farm land in this State would be inundated by the Daugherty and the Hennepin Dams alone, this land taken out of production entirely until such time as the silt from the balance of the watersheds will have washed down and completely filled the reservoirs to such an extent that the same 33,000 acres can again be placed in cultivation and in production of crops.

During the period of years required for the sedimentation of these two reservoirs, this same acreage could produce nothing other than flood control on the river bottoms downstream and help prevent the sedimentation of Lake Texoma unless the water from these said reservoirs would be used for irrigation and for the generation of electric power.

Benefits derived from irrigation from the Daugherty Reservoir would be distributed over the approximate 1 mile of river bottom lying adjacent to and downstream from the Daugherty Dam and would comprise not more than 1,280 acres, hardly a good comparison with the 25,000 acres which would be inundated by that reservoir. In like manner, the Hennepin Reservoir could not irrigate more than 3 square miles of farm land lying adjacent to and downstream from the Hennepin Dam, or approximately 1,920 acres, which does not compare very well with the 8,000 acres which would be made useless. Therefore, benefits to be derived from irrigation provided by these two dams would hardly warrant the cost of constructing them.

Benefits to be derived from the generation of electric power might be of some consideration were such power even remotely needed; however, our information is to the effect that there already exists more power immediately available than would be needed were this State to be as highly industrialized as our sister States in the northern and eastern parts of the country. We further understand that there is no intention to provide any facilities in the design of these dams to permit the generation of electric power.

There are, then, but two remaining arguments for the construction of these dams; namely, flood control and the retarding of the sedimentation of Lake Texoma. Both of these desired aims can be accomplished by means of the plans proposed by the Soil Conservation Service.

Wildhorse Creek watershed contains approximately 427,900 acres. Hennepin Dam would benefit approximately 1,920 acres by the proposed irrigation, would inundate approximately 8,000 acres of the best bottom land, and would not in any way improve the productivity nor prevent the devastation of the remaining 417,980 acres.

In May of 1950 unusually heavy rainfall caused numerous floods in most parts of this State. Many of these were flash floods, with the result that more damage was done to all properties than would have been suffered had the floods been normal.

In Stephens County alone an estimated $190,000 damage was suffered by the county in damage to roads, bridges, and other similar improvements; $115,000 damage was done to properties of the various oil companies operating in the flooded areas; and $630,000 damage was distributed over farm areas in loss of crops and in damage to land, buildings, fences, and other improvements; a damage of $935,000 which does not include any estimated amount of money to cover inconveniences and delays caused by washed-out connecting roads nor the additional expenses to anyone who attempts to travel into or across these areas.

Since Stephens County contains approximately one-half of the watershed of Wildhorse Creek, then during this 1 month alone the flood damage on this one watershed might be estimated at $1,870,000.

This estimated damage can be distributed over only that part of the watershed which was flooded. This would be approximately 35,000 acres, the estimated area subject to flood damage. It does not include damage to the approximate 392,000 unflooded acres received during this heavy rainfall in erosion and loss of fertility.

The reservoirs and ponds proposed by Soil Conservation Service would inun-

date some acreage; however, these would be located in places where the landowners could be accommodated by using them as water supply for their livestock and also for irrigation where practicable. Gully plugs, diversion ditches, terraces, contours, and like structures would retain the rainfall on the land where it is needed, greatly impede runoff, almost completely prevent erosion, and greatly increase the productivity of all hill land, whether that land be in cultivation or in pasture. With the large amount of water which would be retained on the land where it is needed and with the slow runoff of the surplus water, the bottom lands would no longer be threatened by overflows with the resultant crop damage, and the present stream beds could easily accommodate the volume of water delivered to them. The bottom land now idled by overflows could be placed in cultivation; the cultivated land could be made more productive; and the farmers and stockmen would all be enabled to increase their annual incomes. With the increased productive acres more farm families would be required to cultivate them, and living space would be provided to ease crowded city conditions, thus benefiting not only the immediate trade area but also the State as a whole.

We feel confident that reports and estimates will be provided by the proper agencies interested in flood-control work and that any figures which we might attempt to present covering any construction contemplated would be erroneous. However, we are of the opinion that if as much money were appropriated for soil-conservation work as will be spent for the planning and building of the proposed dams and the taking of good land out of production, where those dams are no more necessary than the ones mentioned herein, Soil Conservation Service methods, including small upstream detention reservoirs, would far exceed the big-dams method in benefits to the landowners, to the trade area, to the State, to the Nation, and to the feeding of the millions in foreign countries who are looking to this country for their very existence.

Respectfully presented.

L. L. HUMPHREY,
President, Wildhorse Creek Flood Control Association.

STATEMENT OF LANDOWNERS FROM EAST FORK OF TRINITY RIVER

Mr. Chairman, the group from the East Fork of the Trinity appearing before this committee are farmers, ranchers, bankers, and businessmen who are officers, directors, and supervisors of the East Fork Association; Collin County, Dalworth, and Kaufman-Van Zandt Soil Conservation Districts; and Upper East Fork, Sister Grove, Upper Rowlett, Muddy Creek, Middle East Fork, Buffalo Creek, Duck Creek, North Mesquite Creek, South Mesquite Creek, Lower Rowlett, and Long Branch Watershed Associations within the East Fork. We represent the more than 6,000 landowners within the East Fork. We would like to offer for the record this statement of the wishes and needs of the local people in connection with the agricultural portion of the flood-control program for the Trinity River.

LOCAL INTEREST

The people of the East Fork strongly believe that the upstream, or agricultural, portion of the flood-control program is vital and essential. Without a strong program of soil conservation on the watershed, downstream structures will soon be filled with silt and their effectiveness impaired. The small detention structures designed primarily to prevent flooding of rich bottom lands are also an essential part of upstream flood control. The people of the East Fork have demonstrated their interest in this program by strongly supporting and taking advantage of the facilities available from their soil-conservation districts and by forming watershed associations to better work together in obtaining easements, rights-of-way, and utility changes for detention structures. All necessary easements have been obtained by the local people for 8 detention structures on Honey Creek, and 10 other watershed associations are actively engaged in obtaining other easements.

SOIL CONSERVATION

The people of the East Fork strongly believe in the absolute necessity of a complete program of soil conservation on the entire watershed. We believe that this can be best accomplished through the democratic action of soil conservation districts and strongly recommend that these districts be supported by adequate appropriations to the Soil Conservation Service.

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FLOOD-CONTROL APPROPRIATIONS

In 1944 the estimated cost of this flood-control program to the Federal Government was $32,000,000, and it was proposed to apply this program in 12 to 15 years. Today one-half of the time has elapsed, but the Congress has appropriated less than 15 percent of the funds. Only token appropriations have been made to support this very worth-while and essential program. We urge the Congress to pass adequate appropriations to complete this work in a reasonable length of time.

It has been pointed out that the necessary organizations have been formed and the local people of the East Fork of the Trinity are ready and able to discharge their responsibilities in connection with this program. We understand that this is the case in the remainder of the Trinity. Since the local people do have responsibilities, the ones willing to discharge these responsibilities should not be held back by others not willing to discharge theirs. For this reason we recommend that appropriations be set up and passed on a project, or watershed, rather than a national basis.

Eight of these structures are now under construction, and seven others are scheduled for construction this year. Easements are being obtained where possible throughout the watershed. The effectiveness of these 15 structures is dependent upon the completion of all the structures. This program, when completed, will materially protect all downstream flood-control structures. It should also be pointed out that there is a very small amount of critical materials needed for our defense effort involved in the construction of these structures.

SITE ACQUISITION

Under the existing law the Government constructs the detention structures and the local people provide the sites. Most of these sites have been acquired by the landowner giving an easement to construct the structure and impound floodwater on his lands.

The lakes formed by the permanent storage above these structures have definite real value and where a comparatively small portion of a farm is inundated the farmer has given an easement. Where the value of the lake exceeds the value of the land given up, it is only fair that the easement should be given. There are cases, however, where such a large part of a farm is to be inundated that the remainder would not constitute an economical unit. There are many cases that are beyond the resources of the local people to handle. We recommend that the Congress grant necessary legislative approval for the purchasing of detention structure sites and appropriate funds for land purchase.

The people of the East Fork are in the process of obtaining easements that are within their limitations, but we believe that public money should be spent in the public interest to obtain those sites that are beyond the resources of the local people.

ECONOMY

The people of the East Fork are as interested in economy in government as any group could be. We do not feel, however, that curtailing soil conservation of the agricultural portion of flood control is in any sense, economy. Money spent for this work is the investment that we must depend on to repay the great debt incurred in fighting the war and keeping the peace.

The ratio of benefits to costs for this work is greater than 7 to 1. This can only be considered as a good investment.

In these trying times it becomes more and more important that we produce all we possibly can to protect our way of life. This program in the East Fork alone will reduce the flooding hazard on 67,000 acres of the finest bottom-land soil in the world. These bottoms at present overflow several times each year. The cultivation of these bottoms is too hazardous to be economically feasible. The production of Bermuda grass pasture is the maximum safe use to which they can be put under present conditions. Production on these bottoms is practically unlimited if the flooding hazard is sufficiently reduced. Areas such as these represent our new frontiers. There are no new areas left to be opened up for agricultural production. We must begin to fully utilize these areas of great potential production right here in our own backyard if we are to continue as a strong Nation.

This group appreciates the opportunity of appearing before the committee to express our strong support of the agricultural portion of the flood-control program and of the work of the Soil Conservation Service in assisting our soil-conservation

districts. The people of the East Fork of the Trinity have demonstrated that they are ready to do their full share to further these very worth-while programs and urge the Congress to give their support, through needed legislative actions and adequate appropriations, so that an integrated soil-conservation and flood-control program may be applied to the entire watershed of the Trinity River in a reasonable length of time.

CHAMBER OF COMMERCE,
Chickasha, Okla.

The Honorable SUBCOMMITTEE ON AGRICULTURE, UNITED STATES HOUSE OF REPRESENTATIVES.

DEAR SIRS: The members of the Chickasha (Okla.) Chamber of Commerce wish to commend your honorable committee on conducting this public hearing. We feel that a sound flood-control program is not only necessary but vital to the future welfare of our community.

Chickasha is a city of 16,500 population, located on the Washita River near the geographic center of the Washita Basin. It is the seat of county government of Grady County and is known as the queen of the Washita. There are approximately 700,000 acres of land in Grady County, of which an estimated 110,000 acres is Washita bottom land. These bottom lands are in farms and ranches which produce alfalfa, broomcorn, corn, cotton, grain, sorghums, wheat, oats, barley, rye, vetch, clovers, and truck crops, and include improved pastures. Beef cattle, dairying, sheep, and swine production are also important agricultural enterprises.

Chickasha has grown to its position as queen of the Washita on the strength of an agricultural economy. Every phase of agricultural production peculiar to our valley is served by the business firms of Chickasha as a supply and marketing center. Listed hereinafter are the types of business establishments which are very definitely a part of the agricultural economy:

General office of the Chickasha Cotton Oil Co. which operates 300 gins and 20 oil mills in Oklahoma.
Cotton research station of Oklahoma A. and M. College.
Two cotton compresses.
Six cotton buyers.
Two national banks.
One national farm loan association.
Four creameries.
Eleven farm-equipment dealers.
Two feed manufacturers.
Three grain elevators with Government grain-storage facilities.
Two livestock sales barns.
Two packing plants.
Six dirt-moving contractors.
American Dusting Co. which serves four States with airplane equipment to dispense insecticides and with grass-seeding facilities.
Two ice companies.
Four ice cream manufacturers.
Three manufacturing companies which produce farm equipment.
Five fertilizer dealers.
One bulk fertilizer mixing company.
One poultry equipment supply warehouse.
Three hatcheries.
Two railroads (Rock Island and Frisco lines).
Three veterinarians.
One fruit and vegetable wholesale distributor.
One certified seed warehouse.
Three seed companies, all equipped to process field seeds.
One wholesale grocery company.
One pickle plant.
Eight lumber companies.
Also our local merchants who retail groceries, dry goods, furniture, appliances, and the professional people depend heavily upon the success and patronage of farm people in Grady County.

The business and professional men of our community have keenly observed the threat floods have made to destroy the fertile bottom lands of the Washita which are the basic resource of our economy.

Each year we directly feel the effect of floods which reduce the farm income over our trade territory. We have come to recognize a still more critical problem in the form of permanent flood damage to the land. Furthermore, the chamber of commerce is interested in flood protection for the homes and business houses of Chickasha. We are also deeply concerned over the tie-up of transportation which results from each flood. The board of directors of the Chickasha Chamber of Commerce hereby endorses the Washita flood control program of the United States Department of Agriculture Soil Conservation Service and directs its president to appear before your honorable committee to affirm the same and convey this report for the record of the committee. It is the desire of the Chickasha Chamber of Commerce that your committee make a favorable report to the House of Representatives in Congress and recommend immediate action. Furthermore, it is hoped that the Wickersham proposed supplemental appropriation of $800,000 to the Washita be approved.

Sincerely yours,

LOUIS BURTSCHI, *President.*

THE NATIONAL FARM LOAN ASSOCIATION OF CHICKASHA,
Chickasha, Okla., October 11, 1951.

Subject: Flood control.

To: The Honorable Subcommittee on Agriculture, United States House of Representatives.

GENTLEMEN: The board of directors of the National Farm Loan Association of Chickasha, Okla., invite your consideration of flood-control problems which exist as a threat to agriculture, both locally and Nation-wide. Grady and McClain Counties are served by this association. Membership of the association is as follows: M. E. Seibert, Chickasha; R. L. Spencer, New Castle; Henry Mileur, Rush Springs; Jesse O. Horn, Chickasha; W. M. Walker, Ninnekah. For the purpose of this report, discussion will be confined to the area which drains into the Washita River in Grady County.

Throughout this area we are faced with flood problems on bottom-land farms. These problems have asserted their importance through the hazards of crop production and through the permanent-type damage sustained by the land. Our land appraisers have come to fear the situation. Three permanent-type damages are usually found on valley farms, namely, sediment deposits of infertile material, scour channels through cultivated fields, and stream-bank cutting.

We recognize today that, during the past decade, an estimated 20 percent of all flood-plain lands in Grady County have been abandoned from cultivation because of floodwater and sedimentation damages. We further recognize that this is an existing threat to our agricultural economy because the rate of valley-land destruction is progressive.

We have analyzed the problem and found these two facts:

1. Creek tributaries of the Washita River provide Grady County with approximately 3 acres of alluvial soil for each acre on the Washita main stem.

2. Flooding occurs on the creeks more frequently than on the main stem.

We are, therefore, interested in a flood-control program which will protect the farm lands of the creek watersheds. We have investigated the various programs of flood control and have found one acceptable. The Department of Agriculture flood-control program, which is operated by the Soil Conservation Service, we endorse without reservation.

Note the comparison of acres of bottom land on the Grady County tributaries of the Washita River as compared to the main-stem acreage:

	Acres of bottom land (estimated)
Bitter Creek	14,000
Little Washita River	18,000
Rush Creek (upper)	12,000
High Creek	6,000
Salt Creek	11,000
Line Creek	6,000
Winters Creek	10,500
Roaring Creek	7,000
Round Creek	5,500
Total	90,000
Main stem of Washita	30,000

We desire to point out a very important fact. Only the land which lies below flood-control dams will benefit from said dams. The objective of the Department of Agriculture flood-control program is to get the greatest possible area of bottom land below dams. This is accomplished through the planning of a series of small dams which will store the potential floodwaters. The small-dam solution to our problem of flooding might well be termed "flood prevention."

We recommend that the Washita program of upstream flood control be rushed toward completion in the interest of our local, State, and national welfare.

Date: October 11, 1951.

M. E. SIEBERT,
President, Board of Directors.

Attest:

F. A. MORAN,
Secretary-Treasurer.

MORAN-BACHMAN IMPLEMENT CO.,
Chickasha, Okla., October 12, 1951.

THE SUBCOMMITTEE ON AGRICULTURE,
United States House of Representatives.

DEAR SIRS: I am a tractor and farm machinery dealer in the Washita Valley, county of Grady, located at Chickasha. My firm is dependent, directly, upon the farm production of the county.

My business is little more dependent on the farm production than the many other businesses of all kinds located in Chickasha.

I want to appeal to you in behalf of myself and those other businesses in Chickasha throughout Grady County and throughout Oklahoma because Oklahoma is an agricultural State.

This year our business operated following 2 years of near crop failures. A great proportion of our sales were made with farmers operating bottom lands where production is more constant.

One year ago I moved to Chickasha from Ardmore, Okla., where I had worked over a five-county area surrounding Lake Texhoma.

Lake Texhoma was built as a combination flood-control dam to the Washita River and a power pool. This was disregarding the fact that the dam was being located at the extreme lower end of the Washita River—below all of the flood damage occurring on the Washita watershed and only where it would receive all of the siltation from such damages.

I have seen the consequence to the farmers, businesses, and municipalities of this area from the loss of large areas of highly productive bottom lands due to inundation by Lake Texhoma.

I have also seen the tremendous siltation taking place in that lake and in the river channels above that lake. It is already evident that the ruin to bottom lands will soon extend far above the lake proper, due to loss of the drainage channel, waterlogging of the surrounding soils, and increased overflows farther up the stream.

Not only must the businesses, farmers, and municipalities help pay the tremendous cost of such lakes, but they must also suffer the ever-growing yearly loss of production—the most stable production—which they had.

The saddest part of the story is that such dams, if properly located, would solve only half of the flood-control problem and that for only a few short years, as can be seen in the siltation of Texhoma.

Where we must have flood control, please use your influence to secure the kind of flood control which damages the least amount of our best lands and whose benefits overcome the damage in increased production—the kind which stops and holds as much water as possible near where it falls—the kind which protects itself from ruin from siltation.

Upstream flood control, such as is being done on the Washita, does this kind of a job. It is the only permanent solution to our flood problems. It is also the only type of flood control which will bring continued benefits in the form of increased production to businesses, farmers, and others living in the surrounding areas.

Very truly yours,

A. L. BACHMAN.

GRADY COUNTY SOIL CONSERVATION DISTRICT,
Chickasha, Okla., October 12, 1951.

Gentlemen of the Subcommittee on Agriculture, United States House of Representatives, my name is Howard Slusher. I am employed by the Grady County Soil Conservation District board of supervisors at Chickasha, Okla. My title is district manager. In this capacity I have been in contact each day with farm and ranch owners and operators assisting them with application of land-treatment measures. It is my purpose to report to your honorable committee on the flood-control problems of the Grady County Soil Conservation District and to point out the interest which this problem has developed.

In each of the past 3 years Grady County has been damaged in excess of $1,000,000 by floods on the Washita watershed. This figure is a conservative estimate. Following is a summary of flood history covering the period 1949, 1950, and 1951:

1949

Washita main stem flooded near all-time high-water mark. All crops were destroyed on flooded land. All transportation (car, bus, railroad, and truck) was tied up in all directions for 3 days in and out of Chickasha. All levees were broken or destroyed. Many cultivated fields were abandoned as a result of this flood. Sediment and scour damage was severe. The tributaries of the Washita which produced major floods were Salt Creek, Bitter Creek, Little Washita River, Line Creek, Roaring Creek, Round Creek, and High Creek. County-wide travel was nearly impossible after these storms because of the loss of bridges and damage to roads. Crop damages, however, were the largest single item. Roaring Creek produced a flood which inundated the business section of Alex, Okla. There were other minor damage-producing floods during the year.

1950

Main stem flooded. Crop damages were extensive. Flood damages not as great as 1949 due to shallower flooding. Bitter Creek tributary was flooded by a storm of major proportion. Crop damages alone were estimated at $100,000. Road and bridge damages were equivalent to the 1949 storm, estimated at $75,000.

Rush Creek tributary did not flood at the upper reaches. However, this watershed produced an enormous flood at the lower end which inundated the city of Pauls Valley. Other tributaries had minor damage-producing floods during the year.

1951

Main stem of the Washita was flooded by headwaters from Clinton area. All crops on flood plain land were destroyed. Fences were wiped out; roads and bridges damaged or destroyed; all roads were closed. All levees badly damaged. Many fields were buried with sediment. Many fields damaged by scour channels.

Little Washita River tributary flooded four times; broke all levees; crop damages estimated to total $200,000. Sediment damage severe. United States Highway No. 81 was blocked by each flood.

Line Creek flooded twice; damaged growing crops and roads. Both of these floods were a real damage threat to the business houses in the city of Chickasha. Had the Washita main stem been at flood stage at these particular times, there is little doubt that the city of Chickasha would have sustained a large amount of damage. The other tributaries had minor damage-producing floods during the year.

There is a real need for flood control on the Washita River watershed. Since the floodwaters which inundate the main stem are contributed by creek tributaries, it is essential that the tributaries be controlled. I will therefore go on record with a strong endorsement of the flood-control program of the United States Department of Agriculture. This program which the Soil Conservation Service is administering actually provides flood control. The people with whom I work are familiar with this program, and they are very anxious that all the tributaries of the Washita be controlled with a system of small detention dams which will protect the valuable agricultural lands of the Washita Valley.

I further urge your honorable committee to support the Wickersham proposal now before Congress to provide the Washita with $800,000 supplemental appropriation. This money is urgently needed to do the construction of flood-control dams. Bitter Creek in this area is ready for construction on the basis that the plan is approved by the Soil Conservation Service. Land-treatment measures

have been applied to the Bitter Creek watershed. This was accomplished because of the interest of the land owners and operators in getting the watershed treated for construction.

Date: October 12, 1951.

HOWARD SLUSHER,
District Manager, Grady County Soil Conservation District.

MINUTES OF THE BOARD OF COUNTY COMMISSIONERS OF GRADY COUNTY, OKLA.

RESOLUTION ON UPSTREAM FLOOD CONTROL

Be it remembered that at a recessed meeting of the Board of County Commissioners of Grady County, Okla., held at the courthouse in the city of Chickasha, Okla., on the 11th day of October 1951, the following resolution was unanimously adopted by said board of county commissioners, to wit:

"Whereas flood damages to roads and bridges constitute a financial problem of the county government, and said damages are recurrent with each succeeding flood;

"Whereas county road funds are insufficient to repair said damages in the proper manner, the problem of flood damages to roads and bridges is becoming more acute; and

"Whereas the board of county commissioners feel that it is to the best interest of Grady County to control said floods at their source rather than to attempt to repair all damages resulting from said floods, in that approximately 90 percent of all road and bridge damages occur on the smaller streams (creek tributaries of the Washita River) of Grady County: Now, therefore, be it

"*Resolved*, That the Board of County Commissioners of Grady County hereby endorses the program of upstream flood control of the United States Department of Agriculture Soil Conservation Service and the Grady County Soil Conservation District; be it further

"*Resolved*, That said board of county commissioners does hereby request the Honorable Subcommittee on Agriculture of the United States House of Representatives to make a favorable report to the Congress with recommendations for funds to start construction at the earliest possible date."

Adopted this 11th day of October 1951 by the unanimous vote of said board of county commissioners.

BOARD OF COUNTY COMMISSIONERS,
GRADY COUNTY,
A. J. TIMS, *Chairman.*
GEO. R. BEELER.
H. F. NICHELSON.

Attest:
[SEAL]

MURRAY NIX, *County Clerk.*

GRADY COUNTY SOIL CONSERVATION DISTRICT,
Amber, Okla., October 11, 1951.

The Honorable SUBCOMMITTEE ON AGRICULTURE,
United States House of Representatives.

GENTLEMEN: I am Herschel Goltry, Amber, Okla., representing the Grady County Soil Conservation District board of supervisors, of which I am a member, serving with A. J. Spurlin, Chickasha, Okla.; Carl Heath, Rush Springs, Okla.; E. E. Hatcher, Minco, Okla.; and D. B. Patterson, Alex, Okla.

In the Washita River watershed in Grady County we have approximately 3,000 farms and ranches. Our soil-conservation district has been working with the farmers and ranchers since 1938 on the land-treatment program with results as follows:

Acres of former cropland planted to grass	47,675
Miles of terraces constructed	1,599
Miles of diversion terraces constructed	263
Acres of drainage	6,096
Acres of range improved from poor condition to good or excellent condition	88,427
Acres dedicated as wildlife areas	645
Acres planted to legume cover crops	61,489

These are figures from the soil-conservation district records of farms and ranches. It should be recognized that many conservation practices have been adopted by others not reflected in our records.

The board of district supervisors estimate that there is at this time 60,000 acres of permanent grass planted in Grady County. Members of the board of supervisors are well pleased with district accomplishments up to this date, but we regret that the work cannot be speeded up due largely to lack of technical personnel and adequate funds.

It is our judgment that the farmers and nonoperator landowners in the district have come to an understanding and appreciation of the importance of proper land use, recognizing that some land always must be kept under a cover of permanent vegetation. Other lands may be kept in cultivation if properly terraced. Some areas require drainage. The productivity of the soil must be maintained or improved.

As the representative of the board of supervisors of the Grady County Soil Conservation District and the farmers and ranchers who own and operate the land within the district, we strongly endorse the land-treatment program of the district and the Soil Conservation Service.

We also endorse the upstream agricultural flood-control program of the Department of Agriculture Soil Conservation Service, this program being the only attempt to prevent flooding of fertile bottom lands on the small tributary streams where damaging floods occur frequently.

In Grady County we have a total of many more acres of fertile bottom lands along the small streams than the total acres of the big Washita bottom within the county. I am quite sure that the same is true in other counties along the Washita.

The agricultural flood-control program, including land treatment and reservoirs, etc., present some additional problems to soil-conservation districts. For example, the flood-control plan is made on a given watershed. Farmers and ranchers have completed the land-treatment program. The building of the special flood-control structures is in order. Now comes the problem of obtaining the easements for the sites of the flood-control structures.

Speaking from personal experience, obtaining easements is most difficult and even impossible in some instances. True enough, only a small percentage of fertile bottom land is covered by water behind these small structures. However, when a farmer with only a few acres of bottom land is asked to give these acres, that is asking too much. I submit a map of a small watershed with 13 farm owners from whom easements must be obtained. This situation on a little watershed located on Bitter Creek northeast of Chickasha, Okla., is typical of the problems encountered on the 11 structures planned on the Bitter Creek watershed.

Asking men to give easements is not the American way. We urge that funds for the purchase of easements be included in appropriations for the agricultural flood-control program.

Since my graduation from the School of Agriculture, Oklahoma A. and M. College, in 1913, I have been actively engaged in farming and ranching near Amber, Okla. Through these years I have seen in my own neighborhood hundreds of acres of once-productive farmland lost through flooding on the upper reaches of Salt, Bitter, and Brushy Creeks. The same has happened on all other creeks draining into the Washita River. During these years I have participated in and assisted with may programs for the advancement of agriculture. During all these years, no program has met with such widespread acceptance from farmers and ranchers, businessmen, and members of the press as has this program of land treatment and agricultural flood-control.

Date: October 11, 1951.

HERSCHEL GOLTRY,
Member, Board of Supervisors,
Grady County Soil Conservation District.

(The map submitted by Mr. Goltry is on file with the committee.)

HULSEY-CORNWELL AGENCY,
Chickasha, Okla., October 11, 1951.

To: The Honorable Subcommittee on Agriculture, United States House of Representatives.

Subject: Washita River flood-control program.

Gentlemen of the Subcommittee on Agriculture, my name is Roy Cornwell, of Chickasha, Okla. I am in the real-estate and farm-loan business.

I wish to commend your honorable committee for conducting this study on flood control. For many years I have been greatly concerned about controlling floods on the Washita River and its tributaries. The problem of flooding has caused tremendous readjustments of bottom-land values. Many farms which once produced abundantly and were highly valued are now buried beneath sediment deposits or are scarred with scour channels. Production of these farms has dropped, and values have been greatly reduced. The acreage of abandoned bottom land has reached an astounding figure.

At this time, when our Nation needs the full utilization of all her resources, it has been depressing to see millions of dollars' worth of flood damages reoccur each year here in the central section of the Washita. It is important to note that floodwaters originate on the creek tributaries. For this reason I favor upstream control with a system of small detention dams.

Allow me to make this observation. It is just as logical that flood-control dams be located upstream above the area to be protected as it is to get on the south side of a windbreak for protection against a north wind. There is an additional logic in the upstream program based on the fact that there is more bottom land to be protected on the tributaries than on the river main stem.

In my real-estate business there is a very strong demand for good bottom land. Facing a diminishing supply of this kind of land as a result of flood damage, I am seriously concerned about the future welfare of our agricultural economy in Grady County. Since this local condition is comparable to the national situation, it seems imperative that Congress take necessary steps to provide for the preservation of the land which is the basic resource of agriculture.

I am thoroughly familiar with the flood-control program of the United States Department of Agriculture as administered by the Soil Conservation Service on the Washita watershed. This program has my wholehearted support. I recommend to your honorable committee that this program be stepped up to insure completion at the earliest possible date.

Very truly yours,

ROY A. CORNWELL.

FORT WORTH CHAMBER OF COMMERCE,
Fort Worth, Tex., October 11, 1951.

Hon. W. R. POAGE,
Chairman, Subcommittee on Flood Control, Committee on Agriculture, House of Representatives, Washington, D. C.

DEAR MR. POAGE: Due to the inability of any member of the staff of the Fort Worth Chamber of Commerce to be present at the public hearing to be held in Gatesville, Tex., on Friday, October 12, 1951, we have designated Mr. Forrest L. Park, engineer for the Trinity Improvement Association, as a representative on this occasion. He will present the attached statement.

Very truly yours,

WILLIAM HOLDEN,
Executive Vice President.

FORT WORTH CHAMBER OF COMMERCE,
Fort Worth, Tex., October 11, 1951.

Hon. W. R. POAGE,
Chairman, Subcommittee on Flood Control, Committee on Agriculture, House of Representatives, Washington, D. C.

DEAR MR. POAGE: This constitutes the statement of the Fort Worth, Tex., Chamber of Commerce as presented on the occasion of the public hearing held at Gatesville, Tex., at 1 p. m., Friday, October 12, 1951.

FORT WORTH DEPENDS UPON AGRICULTURE

As indicated by its 56-percent increase in population from 1940 to 1950, the city of Fort Worth is one of the fastest growing major cities of the United States. Although it is a metropolitan area of great industrial importance and possibly could well claim to be the hub of American petroleum and natural gas production, Fort Worth always has recognized that its past growth and its potentialities rest largely upon its regional agriculture. It is the country's greatest inland grain sorghum market and the most important livestock and grain center in the South.

ACTIVITY IN CONSERVATION MATTERS

Since the enactment of the Texas soil conservation districts law in 1939 the Fort Worth Chamber of Commerce has been active in conservation matters; first, in asisting in the setting up and implementing soil conservation districts and, later, in securing Federal authorizing legislation and continuing appropriations.

In these activities the chamber has operated not only independently but in collaboration with or through the Trinity Improvement Association, which agency the chamber assisted in establishing over 21 years ago.

LARGEST OF USDA FLOOD-CONTROL PROJECTS

The Fort Worth Chamber of Commerce considers its immediate area most fortunate in being located largely within the confines of the Nation's major project for "runoff and water-flow retardation and soil erosion prevention in aid of flood-control." This is one of the 11 projects authorized by the Congress in its December 1944 Flood Control Act, being Public Law 534, Seventy-eighth Congress.

TRINITY RIVER WATERSHED WHOLLY ORGANIZED INTO SOIL CONSERVATION DISTRICTS

Trinity landowners have accepted wholeheartedly the obligations of local cooperation in soil and water conservation, having organized every portion of the 12-million-acre watershed into soil-conservation districts.

Each of these districts has entered into a memorandum of understanding with the Soil Conservation Service. Every district within the confines of the USDA flood-control project has worked earnestly toward its consummation.

TRINITY USDA FLOOD CONTROL PRJGRESS HAS BEEN SLOW

Progress during the past 6 years on this phase of Trinity flood control has been disappointingly slow principally because the funds allocated to the Trinity project, from its initiation through last June, aggregated less than 15 percent of its authorization. Yet, the intent of the Trinity Survey Report, upon which the Congress based its 1944 authorization, was to complete the job within 10 to 15 years.

OTHER PROJECTS FAVORED WITH LARGER APPROPRIATIONS

The other 10 projects have received allocations aggregating 35 percent of the total of their corresponding authorizations. Furthermore, the authorizations of some of the 10 have been increased and 2 of them already have had allocations of funds in excess of their original authorizations. Consequently, the Fort Worth Chamber of Commerce is greatly disappointed—as are the other Trinity interests—that allocations to the Trinity projects aggregate only 19 percent of the total appropriation for USDA flood control. The chamber feels that the Congress indicated its value of the comprehensive Trinity program when it set the Trinity authorization at 36 percent of the total authorization for the 11 projects. The chamber believes that future appropriations for the Trinity should reflect this intent of the Congress.

TRINITY PROJECT IS TRULY UNIQUE

The Trinity River project is truly unique, as it constitutes the Nation's only major correlations, on the basis of an entire river watershed, of programs being carried out by long-time Federal departments for soil and water conservation, flood control, navigation, and allied purposes.

The 1945 River and Harbor Act—adopted by the Congress on March 2, Texas Independence Day—authorized the Corps of Engineers to improve the entire Trinity Basin for navigation, flood control, and allied purposes.

TRINITY RESERVOIR AND NAVIGATION PROGRAM IS FAR ADVANCED

The Trinity program, as authorized by the Congress for consummation by the Army engineers, consists of four major reservoirs, the rectification of the Fort Worth and the Dallas levee and floodway projects, and a 50-mile barge channel, all now under construction. Twenty miles of the channel have been completed, three of the four reservoirs will be completed within 12 months, and almost 50 percent of the Fort Worth floodway length is now under construction. It is the considered opinion of the Fort Worth Chamber of Commerce that completion of both the USDA and the Corps of Engineers' programs are essential to the protection and complete development of this area.

USDA FLOOD CONTROL ESSENTIAL TO FORT WORTH

Practically speaking, Fort Worth now has four major reservoirs yielding flood control. Three were built by the local interests, entirely at their own costs, while the fourth, Benbrook, is being completed by the Army engineers. (See the attached exhibit.) But Fort Worth needs additional flood protection from several major creeks flowing through its manufacturing and residential districts.

These creeks all arise well outside the city's metropolitan area and properly fall within the USDA flood-control authorization for the Trinity. Consequently, the Fort Worth Chamber of Commerce is most anxious that the Trinity program henceforth be implemented by specific appropriations in keeping with the congressional intent as indicated by the 1944 authorization.

FORT WORTH READY AND ABLE TO DO ITS SHARE

In thus urging the speeding up of the USDA project for flood control, the Fort Worth Chamber of Commerce also wishes to point out that Fort Worth has led the way in water conservation and control and is still willing to do its share; that is, Fort Worth has never depended entirely on Federal assistance.

Fort Worth was the first Texas city to build municipal levees and to construct a major reservoir; it remains the only Texas city to build reservoirs mainly for flood control, all at its own cost, without either Federal or State aid.

Probably no city in the United States ever did as much to help itself before asking for Federal assistance, which finally became unavoidable, as the completion of Fort Worth's program of water conservation and utilization is to be climaxed by Trinity improvement for barge navigation, which is necessarily a Federal function.

SUMMARY

In summarization, therefore, the Fort Worth Chamber of Commerce respectfully points out:

First. That the congressional authorization for USDA consummation of upstream flood control on the Trinity watershed is in the public interest;

Second. That the evident intent of the congressional authorization has not been reflected in the appropriations made available therefor through the past fiscal year; and

Third. That the local interests stand ready and able to cooperate, as may be found necessary and desirable, in the speeding up of the authorized USDA program so as to prevent its further lag in the comprehensive Trinity watershed program now advancing so rapidly in its other phases, especially those being carried out by the Corps of Engineers.

Very truly yours,

WILLIAM HOLDEN,
Executive Vice President.

(The map submitted by Mr. Holden is on file with the committee.)

TRINITY IMPROVEMENT ASSOCIATION,
Fort Worth 2, Tex., October 11, 1951.

The Honorable SUBCOMMITTEE ON FLOOD CONTROL,
The Committee on Agriculture, House of Representatives,
Washington, D. C.

GENTLEMEN: The Trinity Improvement Association represents the local interests of the 12-million-acre watershed of the Trinity River, Tex., on all general matters relating to the conservation and utilization of its soils and surface waters.

The association is proud to represent an area that has never hesitated to spend its own money and efforts on such basic matters as soil-water-forest conservation, flood control, reclamation, navigation, and allied matters.

The many reservoirs and the hundreds of miles of levees and of major irrigation ditches now functioning on the Trinity watershed were all built, operated and maintained for four decades without $1 of State or Federal aid. Trinity local interests had spent far more than 50 millions of their own funds for such purposes before they asked the Congress for authorization of Federal supplementary projects.

Federal participation in the development of the inseparable natural resources of water and soil was finally sought by Trinity watershed interests for the following reasons:

1. Trinity interests are convinced, by their own experience, that the 1936 Flood Control Act and amendments offer the most practical way, under truly democratic processes, to protect and develop adequately our most important natural resources; and

2. Trinity interests for 50 years have been determined to secure canalization of the Trinity River for practical barge operation into the heart of the southwestern hinterland and such river improvements for navigation is a prerogative of the Federal Government.

The Trinity local interests consider themselves most fortunate in having, by authorizations contained in the 1944 Flood Control and 1945 River and Harbor Acts, the Nation's largest project of comprehensive basin-wide improvement for soil-water-forest conservation, navigation, flood control and allied purposes. As will be seen from the attached exhibit, very material progress has already been made on the major works of the United States Corps of Engineers, which works are truly indispensable in such a basin-wide development.

However, progress has been relatively slow on those flood-control phases of the Trinity program which the United States Department of Agriculture was authorized to carry out as essential to Trinity flood control. This is especially regrettable as the agricultural phases of such a comprehensive program should go along with, if not precede, the Army engineers installation of its major structures.

There also are particular reasons why the Trinity flood-control program of the United States Department of Agriculture is important in the navigation development of the Trinity River:

First, it will protect against excessive deposition the major reservoirs, the long-time functioning of which is essential to the flood control and water supply necessary to Trinity canalization;

Second, where applied, it will increase the annual infiltration by possibly a third, which additional storage in the natural reservoir, the soil, will increase very materially the stream flow over most of the watershed; and

Third, it will decrease from 50 to 75 percent the sediment load of Trinity tributaries, which would lower materially the maintenance costs of the navigable channel.

In closing, I wish to express our appreciation of this opportunity to be heard concerning the value of the soil and water conservation program now being carried out under the continuing directive of the Congress as expressed by the 1936 Flood Control Act and amendments. As carried out in cooperation with soil conservation districts, it is not only the democratic way but also the most practical way of doing the job.

In my opinion, there has been in the last two decades no higher examples of statesmanship in domestic matters than this congressional policy of using the established Federal agencies, the Departments of Agriculture and of Army, to conserve and develop our basic natural resources of water-soil-forest, in cooperation with local interests. Public funds expended to these ends are true investments and as such are doubly important in these times of national emergency when all our resources are being spent so lavishly.

Yours very sincerely,

JOHN M. FOUTS, *General Manager.*

(The map submitted by Mr. Fouts is on file with the committee.)

THE COMPREHENSIVE TRINITY PROGRAM

The Trinity Improvement Association of Fort Worth, Tex., was set up in 1930 by joint committees of the Dallas and Fort Worth Chambers of Commerce to secure the full conservation, adequate control and proper utilization of the water and soil resources of the 12-million-acre watershed of the Trinity River.

By virtue of congressional authorizations and of acts of the Texas Legislature, very material progress is being made in carrying out the comprehensive Trinity program and beneficial results already are being realized, as the reverse side shows.

Major reservior system of Trinity River, Tex. (from records of U. S. Corps of Engineers)

Name of reservoir	Time of completion	Drainage areas contributing	Conservation and silt capacities		Additional capacities for flood control		Top of dam capacities
			Acre-feet [1]	Water surface	Full control	Partial control	
Previously built by local interests:		*Square miles*		*Acres*	*Acre-feet*	*Acre-feet*	*Acre-feet*
Bridgeport	1932	1,051	292,000	10,000	[2]	524,000	861,000
Eagle Mountain	1934	824	211,000	10,000	[2]	458,000	711,000
Worth	1913	94	33,100	3,800	[2]	[2]	95,000
Mountain Creek	1936	289	20,000	4,000	[2]	16,000	81,000
Dallas	1928	1,174	194,000	11,000	[2]	[2]	370,000
White Rock	1911	99	17,500	2,000	[2]	[2]	30,000
Subtotal		3,531	767,600	40,800	998,000+		2,148,000
Now under construction: [3]							
Benbrook	June 1951	416	88,300	3,800	170,400	151,400	475,200
Grapevine	June 1952	688	196,000	7,400	238,200	333,400	914,400
Garza-Little Elm	June 1953	1,648	489,500	23,500	526,700	1,088,500	2,601,700
Lavon	June 1952	764	143,600	11,100	279,800	132,700	713,700
Subtotal		3,516	917,400	45,800	1,215,100	1,706,000	4,705,000
Grand total [4]		5,872	1,491,000	75,600	3,919,000+		6,483,000
Equivalent inches of runoff			4¾		12½		20¾

[1] 1 acre-foot=326,000 gallons.
[2] Depends upon conservation storage stage.
[3] Being built, under authority of 1945 Rivers and Harbors Act of U. S. Congress by Corps of Engineers with appropriations made annually. Local interests are contributing some $6,000,000 cash as well as the existing Lake Dallas, costing $5,300,000 in 1928.
[4] Excluding Lake Dallas, which will be swallowed up by Garza Little Elm Reservoir.

Levee systems of Trinity River, Tex. (from records of U. S. Corps of Engineers)

	Number	Miles of levees	Acreage reclaimed	Initial costs
Organized levee districts	56	397	179,954	$15,944,751
Private levee developments [1]	48	62	[2] 70,000	[2] 4,000,000
Total for known improvements	104	459	[2] 250,000	[2] 20,000,000

[1] Information is incomplete.
[2] Estimated in part.

All levees on the Trinity River and its tributaries were built entirely at the cost of local interests. However, during the past 5 years, some 58 levee repairs have been made by the Corps of Engineers at a cost of some $2,200,000 to the Federal Government.

SOIL-CONSERVATION AND FLOOD-CONTROL PROGRAM OF UNITED STATES DEPARTMENT OF AGRICULTURE

Except for southeastern Grayson County and eastern San Jacinto County, the entire 12-million-acre watershed of the Trinity River receives the full benefits of the 1935 soil-conservation law and amendments of the United States Congress. The exceptions occur because those areas have not been organized as soil-conservation districts under the 1939 Soil Conservation Act of the Texas Legislature.

Under congressional authorizations of the 1944 Flood Control Act, the Soil Conservation Service and the local districts of the upper two-thirds of the watershed, see map on reverse, are cooperating in carrying out the Nation's major program for "runoff and water-flow retardation and soil-erosion prevention in aid of flood control." To date, some $4,000,000 have been appropriated by the Congress. This year the Texas Legislature made its first appropriation ($5,000,000) for soil conservation. All Texas districts (153) including those on the Trinity (22) will participate in this appropriation.

(The map submitted is on file with the committee.)

McLennan County Soil Conservation District,
Texas District No. 12,
October 10, 1951.

To Hon. W. R. Poage, Congressman from Texas.

For permanency in flood control, we the Board of Supervisors of the McLennan County Soil Conservation District representing farmers and ranchers of our district, know from practical experience over a several-year period as conservation farmers that a coordinated conservation program is the only sound way to control floods. We know that our land must be kept in condition to take up most of our rainfall and be able to take it up fast during our hard rains. A long-range conservation program will reduce floods, hold down erosion, and minimize siltation of the dams on our larger streams.

We recommend that flood-control operations be handled through soil-conservation districts and that additional funds be made available to the Soil Conservation Service for technical assistance to our farmers and ranchers in putting a coordinated conservation program on the land.

Respectfully submitted.

Dave Simons, *Chairman.*
L. A. Allen, *Secretary.*
Harry F. Holland, Jr.
Lon Plemons.
R. M. Yowell.

City of Chickasha,
Chickasha, Okla., October 11, 1951.

The Honorable Committee on Agriculture,
United States House of Representatives.

Gentlemen: In your investigation of the upstream flood control in the Washita Valley, we desire to call your attention to the severe floods of the Washita which have caused major flood damage in the city of Chickasha.

Practically all of the major floods on the Washita caused damage inside the city limits. The most severe of these were the 1927 flood and the 1948 flood. An estimate of the tangible damage varies from $150,000 to $250,000 for each major flood that enters the town. The value of the intangible items, of course, cannot be estimated in dollars and cents, but the damage does severely affect public health and safety.

We would also like to call your attention to the Washita tributaries in the vicinity of Chickasha that contribute to, and at times cause flood conditions within the city, even when there is no major flood in the Washita. Among these are Line Creek and Bitter Creek. We understand that authorization for flood-control work on Bitter Creek has been made, but action has not been taken on the appropriation. We urge that the appropriation be made available as soon as possible.

Flood control on the Washita will be of major value and benefit to the city of Chickasha, not only from the standpoint of our water supply, which has been threatened in drought periods, and the elimination of direct flood damage to the city of Chickasha, its transportation, utilities, and communications together with the consideration of public health and safety, but also the consideration of the adverse effects caused within the city due to the damage of the many farms within the trade territory of Chickasha.

Your favorable consideration of all projects in the Washita Basin will greatly benefit the city of Chickasha and Grady County, and will be gratefully appreciated.

Sincerely yours,

H. B. McDowell, *City Manager.*

STATEMENT OF V. C. MARSHALL, EXECUTIVE DIRECTOR, STATE SOIL CONSERVATION BOARD

Today I appear before you as a farmer, a conservationist, and a citizen of Texas. I have no personal ax to grind; no criticism to level at anyone; no complaint to register. I only want to let you know of my interest in the planned effort to reduce the tremendous damage that is done by floods in Texas every year. I consider such a program one of the most useful, most necessary, and most profitable investments that can be made in the interest of the economy and welfare of our people.

When I speak of flood damage I have in mind not only the damage to urban property but also the more serious damage to our soil, our crops, and our farm property. I have learned from reports that I have read that of the total annual average damage on the Trinity River in Texas, three-fourths is agricultural and that on the middle Colorado, it runs about the same.

I mention the Trinity and the middle Colorado because, as you all very well know, these two Texas streams were among the 11 watersheds in the United States in which the Congress in 1944 authorized the Department of Agriculture to undertake a program of watershed improvement, mainly to reduce the frequency and damaging effects of floods. In the authorizing act, Congress made it clear that its intent was to complete these improvements in 15 to 20 years. After about 7 years, however, the estimated allocation of funds for these 11 projects through fiscal year 1951 were reported officially to congressional committees as follows:

	Amount	Percent of original authorization
1. Upper Trinity	$4,703,409	14.7
2. Middle Colorado	704,092	26.2
Subtotals, 1 and 2	5,407,501	15.6
3. Washita	4,483,308	39.2
4. Los Angeles	4,725,825	56.5
5. Little Sioux	3,878,176	90.6
6. Little Tallahatchie	1,249,543	29.6
7. Coosa	403,436	32.6
8. Potomac	431,286	50.1
9. Buffalo	845,542	115.1
10. Santa Ynez	985,480	227.0
11. Yazoo	1,668,497	7.7
Subtotal 3 through 11	18,956,948	35.9
Grand total	24,375,449	27.8

The Texas Water Conservation Association called attention to this disparity and I believe they were right. I don't want to appear as arguing that other watersheds should have received less because this is a mighty necessary and urgently needed project in its entirety and should be prosecuted with vigor and persistence. But I do believe that the two watersheds in Texas are entitled to a more proportionate share of their original authorization than they have so far received. The work in this State is extremely important in itself and can in large measure determine the pattern to follow in other States.

Now, I understand that this disparity of allocations was attributed by the Senate Appropriations Committee to departmental action rather than the action of congressional committees. I believe that something should be done to correct this situation and I'm calling it to your attention in the hope that you gentlemen will be able to do something about it.

The flood-control work of the Army engineers is progressing well in every principal part of Texas. We are gratified that this is so. But the original Omnibus Flood Control Act of 1936 recognized that fundamentally sound and lasting control of water for the benefit of all the people can be attained only through coordinated planning and development of every watershed. This was to be accomplished through (1) conservation treatment of the land; (2) upstream engineering to slow down the flow of water, stabilize stream channels, and protect reservoirs against sedimentation; and (3) major downstream structures for the control of floods that cannot otherwise be controlled, and for other purposes.

The upstream part of this comprehensive program was put largely in the hands of the Soil Conservation Service of the Department of Agriculture. The downstream part was assigned to the Department of the Army through its Corps of Engineers.

These two agencies, the Soil Conservation Service and the Army engineers, from my observations, have been working in close cooperation on this very necessary job. But in Texas the downstream work is getting ahead of the upstream work, and that is the wrong sequence. Flood-control measures on our uplands should be applied ahead of downstream construction because that is the best way to get the most out of this comprehensive program. In fact, the upland work is needed to protect the large downstream reservoirs from siltation as well as to slow down the flow of water as much as possible.

As a farmer and conservationist, I am naturally concerned primarily with the proper use and treatment of agricultural land. I am aware, however, of the importance of and need for the part of the comprehensive program carried out by the Army engineers. Their work picks up where the upland program leaves off. The two jobs go together, and I don't want to leave the impression that I am in any way depreciating the large downstream structures when I place greatest emphasis on the agricultural benefits that a coordinated flood-control program can bring the people of Texas.

As a farmer, I understand well what the cost of a flood can be to a farmer. I have seen the ruined crops, the buildings and fences that were washed away or damaged, and with a tremendous loss of human life and livestock. I have talked with farmers who lost livestock and who had to replant crops washed out. I have seen farm land damaged beyond repair—the topsoil washed out and good bottom land ruined by sterile sediment. I know how badly these flood losses can hurt a farmer financially, how disheartening they can be.

As a farmer and conservationist, I canot emphasize too strongly that I look upon treatment of the land as the foundation of flood control. It is also an investment that brings big returns to the public as well as the individual farmers. Land treatment is the system of conservation practices that makes our soil into a great reservoir capable of holding more of the rain that falls upon it. It keeps the soil in the fields, where it belongs, and can do the greatest good in the production of much-needed agricultural products. It keeps the soil out of the creeks and rivers, the downstream reservoirs, and the harbors. It restrains excess water to an orderly movement from the fields and pastures into the normal channels.

When it comes to engineering structures in our upland-treatment program, we have plenty of evidence of their effectiveness. It has been shown beyond all doubt that the small detention reservoirs, gully plugs, silt traps, diversion terraces, and other such devices, when installed as part of the land-treatment program, effectively reduce the volume of water moving from the land and slow down its flow toward the stream channels.

It is my hope that this meeting will be instrumental in obtaining a more equitable allocation of funds for the agricultural flood-control program in Texas and in speeding up the entire program to greatly reduce the tremendous loss of soil and property caused by floods. We cannot afford to tarry on so urgent a task. To delay means continuing greater losses and finally greater cost for repairs that will stabilize the soil and control disastrous floods.

SAN SABA-BRADY SOIL CONSERVATION DISTRICT No. 214,
Richland Springs, Tex., October 12, 1951.

Subject: Flood control on small streams and their watersheds

CONGRESSIONAL COMMITTEE ON AGRICULTURE
Gatesville, Tex.:

Just at present there is a great amount of public interest in the subject of flood control by farmers, ranchers, city governments, and other interested groups of tax-paying citizens. Loss is felt after each flood by cities, highways, railroads, and is tabulated by our newspapers, running into great sums, but probably the greatest loss is to the rural population in livestock, crops, fences, and other property, and these losses are rarely considered in flood reports. But the greatest flood loss that is not mentioned is the loss of top soil. Such top soil becomes silt, and as such is a detriment to streams and waterways where it collects in water courses, lakes, and ship channels, where silt, which was once valuable top soil, now becomes a source of expense to the Government when it fills our lakes and ship channels.

Flood control is a direct help to our system of large dams in the following ways:

1. It confines the flow of water to the stream bed, preventing erosion, also damage to growing crops and property.
2. Reduces the amount of silt carried into waterways and lakes.
3. Leaves the soil where it should be, to produce food and fiber, and not silt in our lakes.
4. By slowing down the runoff, water is fed to our lakes over a longer period of time which means more power and less silt.

Flood control is an indirect help to everyone, by savings of crops, livestock, soil, and property loss.

I believe that flood control is everyone's business, since the food that we must have comes from our soil and there is no other source.

We believe that flood control is necessary, if we are to maintain our present standard of living, and also to pass on a fertile country to the future generation.

We believe that landowners in any area covered by a flood-control project should maintain a high standard of erosion control, through the help of the Soil Conservation Service.

Flood control is a matter to be considered from now until the end of time, and we think that it should be continued by our Department of Agriculture, and that it should be administered by the Soil and Water Conservation Service, since it is more nearly under the control of the people, who are most affected.

JOE E. ROGERS, *Supervisor.*

BROWN-MILLS SOIL CONSERVATION DISTRICT NO. 523, TEXAS,
Brownwood, Tex., October 12, 1951.

Hon. W. R. BOB POAGE,
Chairman, Agriculture Flood-Control Subcommittee,
Agricultural Flood-Control Hearing, Gatesville, Tex.:

The Brown-Mills Soil Conservation District lies in Brown and Mills Counties; all of Brown County and the western half of Mills County lies within the Middle Colorado River watershed as established by Congress. This district drains to the Colorado River through Pecan Bayou and its tributaries, Clear Creek, Mukewater Creek, and other small streams.

Because of high frequency intensity rains the valleys are subject to frequent overflows and heavy crop, pasture, and other damages result. Fences are washed away, roads damaged, and much erosion occurs. Most of the cultivated lands are in the gently rolling valleys and stream valleys.

On an average, portions of these bottom lands are covered by floods four times a year with total flood area of approximately 32,000 acres which is about 70 percent of the 46,000 total acres in these bottoms.

The total annual floodwater damage within the Brown-Mills Soil Conservation District is approximately $510,000, this is broken down as follows:

Pecan Bayou above Lake Brownwood	$114,000
Pecan Bayou below Lake Brownwood	305,000
Clear Creek	77,000
Others	14,000

Surveys made by the Soil Conservation Service under the Department of Agriculture flood-control program shows by careful estimation that for every dollar spent on flood control on these watersheds there will be an annual benefit of $2 in the form of reduced flood damage to crops, livestock, pasture, roads, and land damages.

For example: The survey report for Clear Creek shows an annual damage of $77,000 and a direct agriculture damage during one storm in July 1945 of $126,000. On Mukewater watershed, which lies immediately to the west of Clear Creek and is partially in this soil-conservation district, direct agriculture damage of $26,035 occurred May 21, 1951, from a storm of 7½ inches of rainfall which fell on a portion of the north central part of the watershed. Had the proposed flood-control program been applied in accordance with the Department of Agriculture program, this damage would have been eliminated or reduced to a minimum.

(NOTE.—Picture of damages in May 1951 filed with the subcommittee.)

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RECOMMENDATIONS BY THE BOARD OF SUPERVISORS

In view of immediate need to control flooding of agricultural land of the drainage area before damages occur and thus reduce floodwater damages in the watersheds which lie in this soil-conservation district of the middle Colorado approved flood-control area, we respectfully request that more adequate funds be appropriated annually so that flood-control planning and construction can be applied more rapidly on more watersheds in the middle Colorado.

Because of the fact that the best arable land of the district lies in the stream valley, 46,000 acres, and because less than 50 percent of the potential cultivated land is being cultivated due to flood hazards, it is our belief that an expenditure of Federal agricultural funds to relieve these damages is highly justified. Particularly is this true since the expected benefits are a return of better than $2 for each $1 spent.

We recommend that this work have a high priority at this time in view of the fact that the Federal Government is urging a greater production of fiber, oil, and food crops so essential and important in the defense program.

WILLIS HILL, *Chairman.*
J. H. PRIDDY, *Vice Chairman.*
W. M. HANCOCK, *Secretary.*
ANSON ODEN, *Treasurer.*
G. G. GOSS, *Member.*

BROWN-MILLS SOIL CONSERVATION DISTRICT, NO. 523, TEXAS,
Brownwood, Tex., October 12, 1951.

To: Congressman R. B. (Bob) Poage, chairman, Agriculture Subcommittee, House of Representatives.

Subject: Needs of the soil conservation program in the Department of Agriculture.

As supervisors of the Brown-Mills Soil Conservation District we respectfully submit the following points for your consideration. We feel that these points represent the desires of the cooperators of the Brown-Mills Soil Conservation District. At the rate farmers in the district are signing district agreements we feel that these views also reflect the wishes of the majority of the farmers and ranchers in the Brown-Mills Conservation District.

I. FACTS ABOUT THE DISTRICT

A. Requests received by the district from PMA for technical assistance in carrying out permanent practices under the AC program during the period July 1 through Sept. 30, 1951 ---------- 194
B. Of the farmers making application for assistance through the AC program the percentage who are now district cooperators ---------- 78
C. Number of farmers signing agreements with the district during the period July 1 through Sept. 30, 1951 ---------- 150
D. Number of farmers who had signed agreements as of June 30, 1951 ---- 1,126
E. Total agreements signed as of Sept. 30, 1951 ---------- 1,276
   1. Your attention is invited to the fact that these farmers and ranchers have signed soil-conservation district agreements so they could have the assistance of technical personnel in working out coordinated soil-conservation plans for their land.
F. Total farms in the district (a landowner may have more than one farm covered by a district agreement) ---------- 3,389

II. NEEDS OF THE SOIL-CONSERVATION PROGRAM OF THE DEPARTMENT OF AGRICULTURE

A. Additional technical personnel is needed:
   1. In assuming its responsibilities under the Secretary of Agriculture's memorandum 1278 the Soil Conservation Service is now doing all of the work in connection with permanent type practices under the AC program that was formerly done by PMA field men, county agents, vocational agriculture teachers, and SCS personnel. In addition to this a considerable portion of the calculations involved in these permanent type practices was done by clerical personnel in the PMA offices.
      (*a*) Since assuming the technical responsibilities in connection with permanent-type practices under the PMA program, the work load of the Soil Conservation Service in this

district on permanent-type practices has increased 300 percent. The workload on nonpermanent practices would have increased in nearly the same proportion if technical personnel had been available to give assistance.

(*b*) Now the SCS with no increase in personnel, a reduction in appropriations is attempting to cary on the work formerly performed by several agencies.

B. The Soil Conservation Service should be granted additional funds in order to—

1. Give full and adequate assistance to those farmers requesting assistance through the AC program of the PMA.
2. Be able to give full assistance to farmers who want to carry out a complete and coordinated conservation program on their farms. This will include soil-conservation practices of all kinds.
3. Assist farmers and ranchers in maintaining the soil-conservation practices they have installed. Maintenance of soil-conservation structures is essential to the protection of the investment that the Federal Government has made in these practices through the AC program.

III. IMPROVEMENT OF THE SOIL-CONSERVATION PROGRAM OF THE DEPARTMENT OF AGRICULTURE

A. In order to better serve the farmers of the Nation, it is recommended that all soil-conservation activities of the Department of Agriculture be assigned to one agency of the Department, preferably the Soil Conservation Service. The Soil Conservation Service is recommended for the following reasons:

1. The Soil Conservation Service has the trained personnel capable of assisting farmers and ranchers in carrying out a complete and coordinated soil-conservation program.
2. With its trained personnel the Soil Conservation Service is the agency most capable of meeting the Department's basic soil-conservation objective.
   (*a*) "The basic physical objective of soil-conservation activities by Department agencies shall be the use of each acre of agricultural land within its capabilities and the treatment of each acre of agricultural land in accordance with its needs for protection and improvement."
3. It would result in a saving to the Government if all soil-conservation activities were centered in one agency.
4. Local administration of the Department's soil-conservation program through the soil-conservation districts is most feasible because—
   (*a*) Soil-Conservation districts are legal subdivisions of the State government authorized by State legislation to deal with local soil-conservation problems.
   (*b*) Supervisors of soil-conservation districts are landowners in the district and are elected by landowners of the district.

WILLIS HILL, *Chairman.*
J. H. PRIDDY, *Vice Chairman.*
W. M. HANCOCK, *Secretary.*
ANSON ODER, *Treasurer.*
G. G. GOSS.

TARRANT COUNTY WATER CONTROL AND IMPROVEMENT DISTRICT, NO. 1,
Fort Worth, Tex., October 12, 1951.

The Honorable SUBCOMMITTEE ON AGRICULTURE AND FLOOD CONTROL,
House of Representatives, Congress of the United States.

GENTLEMEN: As general manager for the Tarrant County Water Control and Improvement District, No. 1, the organization that constructed the two large reservoirs above Fort Worth on the West Fork of the Trinity River (without any State or Federal assistance), I desire to express to this committee our appreciation of the splendid accomplishments by the supervisors of the Upper West Fork Soil Conservation District in cooperation with the United States Department of Agriculture Soil Conservation Service in their program of soil and water conservation.

The watershed of our two reservoirs, Eagle Mountain and Bridgeport, situated within the Upper West Fork Soil Conservation District contains 1,821 square miles.

The treatment and utilization of the lands within this drainage area is of vital concern to our district.

The Department of Agriculture made a siltation survey of the above-mentioned reservoirs about 10 years ago which determined that our conservation storage was being depleted at the rate of 1,830 feet annually.

Directly below the Bridgeport Dam on the West Fork to the confluence of Sandy Creek, the channel has generally improved as to depth and capacity due to loss of a greater part of the stream's silt load in the reservoir above, and to the scouring effect of released waters. Below the confluence of Sandy Creek, the channel of the West Fork has gradually filled with sand until its capacity has been reduced in one particular area from 1500 to 210 cubic feet per second. This condition has been temporarily remedied by this district at an expenditure of over $2,400. The channel of Sandy Creek has been reduced to a mere drainage ditch within the past 20 years, and its floodwaters now spread over valuable valley lands, continuing to carry its silt load into Eagle Mountain Reservoir.

I am convinced that the greatest asset in preserving the investments in reservoirs downstream is the program being initiated by the Upper West Fork Soil Conservation District in preserving their properties on the tributaries of this watershed.

Flood control on the small tributaries of our streams should be integrated with the soil conservation program.

Tributary watersheds properly treated by proven methods and practices for soil and water conservation, including detention dams and channel improvement, will increase the useful life span of the downstream reservoirs, improve the quality of water stored for beneficial uses and minimize floods.

I believe that the best way to carry out this program is by local autonomy arrangement between the soil conservation districts and the technical assistance furnished by the Department of Agriculture.

In recent years, the people of our cities have come to realize that land and water are the primary sources of wealth that affect their destiny as well as the rural population. We are now beginning to repair and to an extent overcome the results of previous unintentional exploitation of our land and water resources: Therefore, we urgently request that Congress provide such funds as are necessary to continue this program in the Trinity River watershed.

I am sure all of us recognize and appreciate the many benefits derived from the Soil Conservation Service, and knowing their capability and willingness to serve, we should oppose any contemplated change from the way it is now being administered.

Respectfully submitted.

C. L. McNAIR, *General Manager.*

CENTRAL COLORADO SOIL CONSERVATION DISTRICT

The Central Colorado Soil Conservation District lies in Coleman, Taylor, and Calahan Counties and drainage is to the Colorado River mainly through Pecan Bayou and its tributaries, Home Creek, Panther Creek, and Elm Creek.

This district lies within four soil conservation problem areas: Reddish Prairie, Edwards Plateau, Rolling Red Plains, and Cross Timbers soils.

The topography is generally gently rolling to rolling and the arable areas lie predominately in the gently rolling slopes and in the valley bottoms. Due to the high intensity rains the valley bottoms are subject to frequent overflows and the farmer and rancher gambles when he farms these fertile areas. However, it is necessary that as much of the bottoms as possible be farmed since it is necessary to the economy of the area. Approximately 72,000 acres lie in the flood plain of the streams of this area and approximately 30 percent of the flood plains are being cultivated. On the average the bottoms flood six times a year to some extent thus subjecting part of the flood plain to several floods annually The total area flooded annually exceeds the 72,000 acres in the flood plain. The total floodwater annual damage for the district exceeds $1,500,000 and the average per acre damage is approximately $21. This annual damage is broken down as follows:

Pecan Bayou above Lake Brownwood	$293,000
Jim Ned Creek	709,000
Mukewater Creek	444,500
Others	128,000
Total	1,574,000

A typical storm for this area is the one that occurred April 4–8, 1934. The total rainfall averaged 3.3 inches over the district and caused $73,938 damage in the Mukewater Creek watershed and $88,753 damage in the Jim Ned Creek watershed. Most of this damage was to crops and pasture.

It is believed that an over-all program of conservation, flood control detention structures and floodways will alleviate a major portion of these floods and the damage caused by them. The economy of the area should be greatly benefited by such a program.

Respectfully submitted.

J. C. DIBREL, Jr.,
Chairman, Board Supervisors, Coleman, Tex., District 567.

STATEMENT OF CLAUDE JONES, VICE PRESIDENT, FIRST STATE BANK, GAINESVILLE; CHAIRMAN, 16 BANKS IN UPPER ELM-RED SOIL CONSERVATION DISTRICT

Mr. Chairman and members of the committee, first on behalf of my friends of north Texas and myself, I wish to express my appreciation for an opportunity to come before you and be heard.

I am Claude Jones, banker of Gainesville, Tex., and am here speaking for the district supervisors, landowners, and businessmen of the Upper Elm-Red Soil Conservation District located in north Texas. Our district is composed of 1,667,000 acres, 62 percent of which drains to the Red River with the remaining 38 percent draining to the Trinity River.

I have with me the chairman of our district board and several landowners who own land along Elm Fork of the Trinity.

Our purpose here today is to present to you a problem which we have and need help on. I can say with pride that there is much interest in soil and water conservation in our district among both landowners and businessmen. We have yet a long way to go but we do feel that we are making progress.

Agricultural flood control construction is our big need at the present on Elm Fork of the Trinity and we solicit your careful consideration in future agricultural flood control appropriations.

The Elm Fork watershed of the Trinity is composed of 253,810 acres, 98 percent of which is in farms with 2 percent being in urban areas, roads, and railroads. The bottom land area of the flood plain is composed of 16,037 acres.

Elm Fork and its tributaries flood frequently and cause high annual damages. Up and down the watershed there is an average of four floods per year. During the 20-year period from 1923 to 1942, inclusive, we experienced 18 major floods and 64 smaller floods.

The types of flood damage encountered in the watershed are:

1. Damage to crops and pastures.
2. Deposition of sediment in reservoirs and on valley lands.
3. Damage to roads, bridges, fences and farm equipment.
4. Loss of livestock.

We feel that it would be of interest to you to know that the total direct floodwater and sedimentation damages are estimated to average $206,222 annually under present conditions, of which 72 percent is crop and pasture damage.

We feel that in order to solve this problem that conservation measures on the land coupled with detention structures is the answer.

The Soil Conservation Service has prepared a preliminary flood control plan for Elm Fork of the Trinity which calls for the construction of 23 detention structures at an estimated cost of approximately $2,800,000, land acquisition included.

One of the reasons that this is so attractive to me is the cost benefits ratio. The average annual benefis from this system of 23 detention structures amounts to $201,968, while the average annual cost of the measures amounted to $84,260. That gives you a 2.40 to 1 ratio. It looks to me like money would be spent wisely and well on that basis. The benefit from such a system of detention structures is calculated on the basis of reduction in annual flood damages and from more intensive use of the flood plain lands. The damages are based on the present land use, production and present prices of agricultural products.

It is our opinion that a greater reduction in over-all damages to the Trinity River flood plain lands can be had by carrying out the flood control program including the installation of such a system of detention structures on the subwatersheds in the upper reaches of the Trinity River watershed, as a first priority.

Finally I want to make two recommendations for your consideration:

1. There is a need for an increase in appropriations for agricultural flood control in keeping with the 15-year timetable set up to do the job on the Trinity River watershed which started in 1946. These increases should be in line with the construction phase.

2. We feel that there is a need for a change in the way agricultural flood control money is now appropriated. In order that more local interest may be developed in the program it is our feeling that appropriations should be made directly for individual subwatersheds. Therefore we would solicit your consideration for a special agricultural flood control appropriation for Elm Fork of the Trinity River.

Here are sufficient copies of our narrative for each of you, which covers more in detail our flood control problems and needs.

Thank you.

LITTLE RIVER-SAN GABRIEL SOIL CONSERVATION DISTRICT,
Bartlett, Tex., October 11, 1951.

To: Hon. W. R. Poage, Congressman from Texas.

We, and the farmers and ranchers in our district, believe that a conservation program on the land which meets the basic conservation objectives of the United States Department of Agriculture is the only sound approach to solving the problem of floods in this country. Our land is sick from the lack of humus and organic material; too much of it has lost its life and sponginess. Our land being in such poor physical condition on too many farms, cannot take up fast enough and store enough of the rain that falls.

Sound land use and proper treatment includes deep rooted grasses and legumes. A long range coordinated conservation program put on the land by the farmer, with sound technical advice and help from the Soil Conservation Service, will reduce floods, minimize siltation in our streams, and hold down our topsoil.

A flood-control program cannot leave out these things. A flood-control program must be administered through soil-conservation districts.

Respectfully yours,

ALBERT STEGLICH.
W. L. WILSON.
A. G. BRAUN.
A. G. GRAVES.
S. J. MARTURANO.

CENTRAL TEXAS SOIL CONSERVATION DISTRICT No. 509,
Temple, Tex., October 10, 1951.

To: Hon. W. R. Poage, Congressman from Texas.

We, the supervisors of the Central Texas Soil Conservation District representing 1,500 farmers and ranchers cooperating with our district, have, from actual experience with and observation of a coordinated conservation program on the land, without reservation concluded that such a conservation program is necessary in a program of flood control.

The landowners and operators must put and keep the land in such condition that it will be able to absorb the maximum amount of rainfall as fast as it falls, thus keeping the amount of runoff to a minimum. With reduced runoff as a result of a long range coordinated conservation program fewer floods will occur, less soil will be lost, and less siltation behind the expensive major dams and flood-control structures on the larger streams. We believe that a coordinated conservation program will also reduce considerably the need for dams on our streams.

We urge the increase of appropriations to the Soil Conservation Service for flood-control operations in soil-conservation districts. Landowners must have sound technical advice on a coordinated conservation program carried on through a democratic organization, soil-conservation districts.

Respectfully yours,

K. W. BARTH.
A. L. THOMPSON.
EDWIN F. FISCHER.

SAN ANTONIO, TEX., *October 11, 1951.*

Hon. W. R. POAGE,
Care Flood Control Hearing, Gatesville, Tex.:

The people of southwest Texas are greatly interested in the conservation of water both by means of storage and upstream flood control, and by better irrigation methods. The San Antonio River Canal and Conservancy District has recently put $75,000 in trust in the Treasury of the United States to finance a detailed survey of runoff, water-flow retardation, and soil-erosion prevention by the soil conservation service of the Department of Agriculture. This survey is planned looking toward the development of small dams on the tributaries of the San Antonio River. For the purpose of determining the feasibility of retention reservoirs on the creek watersheds of the San Antonio River. This survey is now being made. We request that our interest as evidenced by this telegram be made a part of the records of your hearing.

W. B. TUTTLE,
Chairman, San Antonio River Canal and Conservancy District.

LITTLE ROCK, ARK., *October 11, 1951.*

Hon. W. R. POAGE,
Chairman, House Agriculture Subcommittee, City Hall, Gatesville, Tex.:

Notice of your committee's public hearing in Gatesville came too late for me to make personal appearance, but I want to put the Arkansas Basin Flood Control Association on record as favoring the United States Department of Agriculture program for the control of floods on agricultural land. Arkansas has a vital interest in this program of runoff and water-flow retardation. I have personally observed the effectiveness of the Soil Conservation Service Flood Control work on the Washita River watershed in Oklahoma. This is what we need in Arkansas; especially in the Arkansas, Red, White, River Basin. Let me commend your committee for holding such public hearings where citizens are given opportunity to express their needs and views on such public improvements as flood control program. I am sorry time does not permit my personal appearance but with your permission I will file a supplemental report with your committee.

FRED SMITH,
Executive Secretary, Arkansas Basin Flood Control Associations, Dardanelle, Ark.

SUPPLEMENTARY STATEMENT OF ARKANSAS BASIN ASSOCIATION ON THE CONTROL OF FLOODS

Studies made by the Soil Conservation Service of the United States Department of Agriculture show that floods in the lower Arkansas River watershed inflict damages exceeding an average of $5,000,000 a year. The lower Arkansas watershed is generally considered the valley below Tulsa, Okla., excluding the Canadian, Grand (Neosho), and Verdigris River watersheds.

Most of this tremendous damage occurs in the tributary areas above United States Army engineers reservoirs now in existence or authorized for construction.

On the tributaries above these reservoirs, 530,000 acres of valley flood plains are subject to flooding. In this same area, flood waters have damaged, in various degrees, 110,000 acres of valley land through scour erosion during the past 40 to 60 years. In addition the loss of soil through erosion adds up to an average of 54,700,000 tons a year. Soil scientists figure that the volume of soil equals more than 392 farms of 160 acres each with topsoil 6 inches deep.

That is a serious and tremendous loss to be suffered in the lower Arkansas River watershed every year. It cannot continue at that rate without dangerously weakening the economy of the area and seriously affecting the productive capacity of the entire Nation.

Another kind of flood damage is caused by the piling up of sediment, the remains of good topsoil washed down from farms above. This mud and sand pile up in creeks and streams, reducing their channel capacity and making it increasingly easy for them to overflow their banks and thus multiply the occurrence of floods. The sediment also piles up in costly reservoirs, cutting down their capacity to hold water and thus reducing their length of life.

Sediment also damages bottomland by covering our fertile soil, the best we have. In the Arkansas flood plain, 10,600 acres of our most productive land are damaged every year, on the average. That can be figured as 66 high producing 160-acre farms damaged every year. Neither Arkansas nor the Nation can afford such loss in productive capacity year after year.

There is no need to endure this loss. There is an effective system of control that has already been tested enough to prove its value in reducing flood damages substantially. We have seen it in the process of installation and in operation. It is the kind of program that we favor. It is the program of the Soil Conservation Service of the United States Department of Agriculture as it is being carried out in the Washita River Basin in our neighboring State of Oklahoma.

We have observed and have studied reports of the effectiveness of that program on the Washita. We can cite cases like that of Mr. Barnett who farms near Purcell, Okla. Before remedial work was done on neighboring farm land, floods washed out the crop on Mr. Barnett's fertile bottomland 7 years in a row. Shortly after the completion of land-treatment measures and supporting mechanical structures above the Barnett farm, the heaviest rain in 40 years fell. The rain was measured at 11 to 15 inches over the Owl Creek and adjacent watersheds. But the young corn on Mr. Barnett's bottomland was not harmed. Later he harvested 45 bushels of corn an acre, the first return he had been able to get from that field since he had been farming it.

Near Mr. Barnett's place in the Owl Creek watershed is the farm of Mr. Leveridge. Mr. Leveridge has 30 acres adjoining the creek. When he started farming this place 20 years ago, crops were good but in wetter years production did not amount to enough to make farming the 30 acres worth while. He had about given up trying to farm the land when the heavy rain of May 1950 occurred. Then he saw that his bottomland had escaped damaging overflow. It was now protected by agricultural flood-control measures above it. Mr. Leveridge immediately made plans to grow corn and cotton again on that rich bottomland.

In a nearby watershed lacking overflow protection, Mr. Key saw his cotton, up to a good stand, covered with sediment up to 12 inches deep, result of flooding caused by the intense May 1950 rain.

And so our observations go. Multiply these small damaged areas and we get a huge total of waste and loss. Multiply the small tracts that agricultural control methods have helped by the thousands that can be helped, and we get an idea of the magnitude of the good that can be done in protecting and increasing the productive capacity of our Arkansas farm land.

Our approval of the program being carried out by the Soil Conservation Service of the United States Department of Agriculture does not mean that we are opposed to the program of reservoir construction being carried out by the United States Corps of Engineers. On the contrary, we look with favor on the engineers' projects. We believe the two go hand in hand but are convinced that the large reservoirs cannot do their work effectively without the upstream program. We believe too that to get the most out of both programs, the upstream projects should be carried out first.

From our observations, we can say that the Soil Conservation Service and Army officials have been working on this project in Arkansas with understanding and harmony. We should like very much to see this splendid cooperation continued.

Our own studies and observations and our consultations with authorities on the subject prompt us to recommend the following as some of the measures needed in the Arkansas River Basin: Development of pastures, meadows, and woodlands on severely eroded land that cannot be cultivated safely or profitably; improvement of existing pastures to provide better protection of the soil and greater forage for the production of livestock; grassed waterways to carry water discharged from field diversions and terraces off safely; tree planting in understocked woodlands, improvement of all woodlands; complete fire protection for wooded areas; field diversions to take excess rain safely around cropped fields; terraces to slow down the flow of water on sloping land; stabilization of gullies in severely eroded areas; structures to stabilize grades and control waterflow; upstream structures to retard floodwater and protect land not protected by larger reservoirs; stream bank straightening and channel improvement; installation and improvement of drainage outlet works and farm drainage systems; and development of irrigation facilities.

This is the kind of flood control program that this organization implores the Congress to authorize and to appropriate the necessary funds to carry out forthwith.

THE ARKANSAS BASIN ASSOCIATION,
By FRED A. SMITH,
Executive Director, Dardanelle, Ark.

CITY OF BROWNWOOD, TEX., AND BROWNWOOD CHAMBER OF COMMERCE, BROWNWOOD, TEX.—PETITION FOR LEAVE TO INTERVENE

IN THE MATTER OF REQUEST FOR PRELIMINARY SURVEY OF LOWER PECAN BAYOU BELOW LAKE BROWNWOOD FOR THE CONVERSION AND DETENTION OF FLOOD WATERS

Before the United States Department of Agriculture, Soil Conservation Service, Washington, D. C.

Hon. W. R. POAGE,
Congressman From Texas,
House Agriculture Subcommittee, Washington, D. C.:

Your petitioners, the city of Brownwood, Tex., and the Brownwood Chamber of Commerce, Brownwood, Tex., come now and respectfully presents to the United States Department of Agriculture that they have an interest in subject petition, and request leave to intervene in this proceeding, and in support of this petition states that:

1. The city of Brownwood, Tex., a municipal corporation of the State of Texas, with principal offices at 400 Fisk Street, Brownwood, Tex., and has as its objective the conducting of the city's business, in matters pertaining to: collecting taxes, protecting the citizens from disaster (including flood), building and repair of public buildings and streets, and furnishing water, sewerage, and gas service to business and residents of the city. Mr. A. N. Thomason is duly elected and acting as mayor; and service may be made upon petitioner by service on its mayor, whose address is 400 Fisk Street, Brownwood, Tex.

2. Brownwood Chamber of Commerce is a nonprofit organization, incorporated under the laws of the State of Texas, with principal offices at 201 North Fisk Street, Brownwood, Tex., and has as its objective, among other things, to develop and promote civic, commercial, and industrial betterment in and around Brown County, Tex.; Mr. J. T. Hughes is the duly elected and acting president, and services may be made upon petitioner by service on its president, whose address is 201 North Fisk Street, Brownwood, Tex.

3. Your petitioners have a property, or financial interest, in the above entitled proceedings, which may not be adequately represented by existing parties, and they seek intervention pursuant to the provision of the rules and practices of such committees.

4. Brownwood, the county seat of Brown County, Tex., is located in the very center of Texas, and has an estimated population of 20,140, as of 1950. Has a county population of 28,460.

5. The petitioners represent the principal industrial, educational, commercial, financial, and other business interests of Brown County; these interests, collectively, are large taxpayers to Brown County, the city of Brownwood, and to the Federal Government, and, as such, ultimately bear a substantial share of the cost and expenses of soil conservation services for Brown and Mills County, located within the middle Colorado watershed.

6. Flood control, and the conservation and detention of waters, is of vast importance to Brownwood and Brown County, in that property, life, and real estate losses have been tremendous from floods over the period since the completion of the dam for Lake Brownwood. There is no need to refer to flood conditions previous to the completion of Lake Brownwood, in 1932. The dam and the lake have saved flood conditions on numerous occasions. The Corps of Army Engineers has approved improvements at the lake, which would include a spillway, with floodgates, to withhold water until such time as it can be released without causing flood conditions on the lower Pecan Bayou Valley.

7. Taken from the report of the Corps of Engineers of the United States Army, Office of the Division Engineer, Southwestern Division, Dallas, Tex., on the 28th day of March 1949, we quote, as follows:

"The report is unfavorable to the improvements desired, in that the reservoirs desired by local interests on the watershed of Pecan Bayou above Lake Brown-

wood, and the improvements desired by local interests on Willis and Adams Creeks for the protection of property in and near the city of Brownwood were found to be economically unjustifiable at this time, and were accordingly not recommended for adoption as Federal projects."

8. Thus, according to House Resolution 4911, of the Seventy-Seventh Congress, the subject matter referred to would come under the jurisdiction of the Department of Agriculture, wherein investigations of this nature would come under the jurisdiction of the Secretary of Agriculture, and the Soil Conservation Service to provide ways and means of retarding water runoff and soil erosion.

9. The Brown-Mills Soil Conservation District lies in the Brown and Mills Counties. All of Brown County, and the western one-half of Mills County lies within the middle Colorado River watershed, as established by Congress. This district drains to the Colorado River, through Pecan Bayou, and its tributaries, and miscellaneous other streams.

The Brown-Mills Soil Conservation District has five soil conservation problem areas; Reddish Prairie, Edwards Plateau, Rolling Red Plains, Cross Timbers, and Grand Prairie Soils. The topography is a gently rolling to rolling, and the arable lands lie mainly in the gently rolling areas and stream valleys. The frequent high intensity rains causes these valleys to be subject to frequent overflows, with heavy crop and pasture damage resulting. Some livestock losses have also occurred. Fences have been destroyed, roads damaged, topsoil washed away, and silt deposits on property have caused tremendous economical losses. It is estimated that the total flood damage on the lower Pecan Bayou watershed exceeds $500,000 a year.

10. It is realized that the Soil Conservation cannot take into consideration property losses that are not classed as affecting agriculture. The floods in the past several years have been very damaging to the city of Brownwood, as a result of runoff water on the Williams Branch, Adams Branch, and Willis Creek, whose watersheds are to the north and west of the city. These streams, on numerous occasions, have created flash-flood conditions, which have destroyed property within the city. There is evidently some way of estimating soil erosion and crop damage on these rapid runoffs of the watershed above the city. That being the case, we are sure that it would be found that the loss would be of a definite economic value to the counties' rural area, regardless of the loss and property damage within the city limits.

11. Lake Brownwood was built without Federal funds, through creation of the Brown County Water Improvement District No. 1, and the subsequent voting after tremendous efforts by the farsighted pioneer leaders of that community of bonds to finance the construction. Of the bond principal and interest, nearly $2,000,000 of construction and improvement issues remain outstanding. It is believed that the city and the county could not afford to finance additional construction of the detention structures on Williams Branch, Adams Branch, and Willis Creek. Since flood control is an accepted responsibility of the Federal Government, we hold that this is the proper place for this project.

12. In 1932, rains from 2 to 8 inches occurred over the Lake Brownwood watershed. The dam for Lake Brownwood had just been completed, and the lake was still unfilled, but within 26 hours, the lake was flowing through an unimproved spillway down the lower bayou. Had the lake been filled when those rains occurred, you can judge for yourself what would have happened. This item is sighted to show the tremendous amount of water that can be accumulated on the upper Pecan Bayou watershed.

13. In 1945, as a result of a 2-inch rain on the Williams and Adams Branch watershed, it created flash-flood conditions which inundated a square mile area of the city of Brownwood, and trapped 200 families in their homes. As a result, one life was lost in that flood. The Red Cross was required to feed 335 people. It was estimated that 175 houses and other buildings were damaged. This flood was estimated to be the worst in 45 years. Obviously, the flood was a minor one, but it serves to exemplify the shadow of disaster under which a large percentage of the 20,000 inhabitants of Brownwood and other residents of the low-lying areas along Pecan Bayou, and tributaries below Lake Brownwood live.

On June 12, 1951, rains ranging from 1½ inches to 8 inches on the upper and lower Pecan Bayou watershed created flood conditions which caused the loss of life, causing 125 people to leave their homes, and an estimated damage within the city of $250,000. The damage to crops and loss of livestock has not been estimated. A tomato crop and a sweet corn crop were ready for harvest, and these crops were either covered by water, or water covered the roads between the fields and the packing sheds, allowing the crops to spoil in the fields.

Perhaps it would be well to think in terms of human lives and security, rather than property values. In these times, when economy really needs to begin at home, we believe it would be economical in the years to come to appropriate the money needed to continue with preliminary surveys to the point of where the work necessary to retard these waters would be started, with a result of annual benefits amounting to considerable more than the estimated cost.

It gives us satisfaction to join with the Brown-Mills County Soil Conservation District in asking that the United States Congress reconsider and to place back in the appropriations the money needed to complete the work necessary on the middle Colorado River watershed.

14. By reason of the foregoing, the city of Brownwood, Brownwood, Tex., and the Brownwood Chamber of Commerce, believe and therefore assert that, as representatives of our taxpayers, organized business, commercial, and civic activities in Brownwood and Brown County, Tex., we have a substantial and material interest in the subject matter of this proceeding, entitling us to become formal parties thereto.

Wherefore the city of Brownwood, and the Brownwood Chamber of Commerce, prays leave to intervene, and to be treated as parties hereto, with right to have notice of and to appear at the taking of testimony, to produce and to cross-examine witnesses, to file briefs and motions, and to be heard at the oral argument, if oral argument is granted.

CITY OF BROWNWOOD, TEX.,
A. N. THOMASON, *Mayor.*
BROWNWOOD CHAMBER OF COMMERCE
J. T. HUGHES, *President.*

Dated at Brownwood, Tex., October 10, 1951.

VERIFICATION

The STATE OF TEXAS,
County of Brown, ss:

A. N. Thomason, upon oath, states that he is mayor of the city of Brownwood, and, as such, is authorized to make this affidavit for and on its behalf; that he has read and is familiar with the contents of the foregoing petition for leave to intervene; that he intends and desires that in granting or denying said petition, the United States Department of Agriculture shall place full and complete reliance upon the accuracy of each statement therein set forth; and that, to the best of his information and belief, every statement contained in said petition is true, and no such statement is misleading.

A. N. THOMASON.

Subscribed and sworn to before me this 10th day of October 1951.

[SEAL] BARBARA E. TAYLOR,
Notary Public in and for Brown County, Tex.

My commission expires June 1, 1953.

VERIFICATION

The STATE OF TEXAS,
County of Brown, ss:

J. T. Hughes, upon oath, states that he is president of the Brownwood Chamber of Commerce, and, as such, is authorized to make this affidavit for and on its behalf; that he has read and is familiar with the contents of the foregoing petition for leave to intervene; that he intends and desires that in granting or denying said petition, the United States Department of Agriculture shall place full and complete reliance upon the accuracy of each statement therein contained; that he is familiar with the facts therein set forth; and that, to the best of his information and belief, every statement contained in said petition is true, and no such statement is misleading.

J. T. HUGHES.

Subscribed and sworn to before me this 10th day of October 1951.

[SEAL] BARBARA E. TAYLOR,
Notary Public in and for Brown County, Tex.

My commission expires June 1, 1953.

SOIL CONSERVATION AND FLOOD CONTROL

OCTOBER 30, 1951

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON SOIL CONSERVATION AND FLOOD
CONTROL OF THE COMMITTEE ON AGRICULTURE,
Colby, Kans.

The subcommittee met at Colby, Kans., Hon. W. R. Poage (chairman) presiding.

The CHAIRMAN. The meeting will please come to order. We will try to start it on time, although some of the members are not here.

We anticipated that Mr. Hope, who represents the southwest part of this great State, would be present when we met this morning, because I would have liked to have had him take over and preside at this meeting in his home State. I am sure he will be in shortly. I understand that he is driving up from his home this morning.

Mr. Patten, of Arizona, will also be present. Our members are like all the rest who attend these meetings; sometimes they are a little late.

We are going to go ahead because we have a number of people who are interested in presenting their views and ideas to the committee and the committee will want to hear from everyone. We will stay in session until we have heard from all who want to be heard. We cannot hear everyone first, so we will have to go down the line and hear the various witnesses. We will stay here until everyone has had a chance to be called because we believe the problems before us are of extreme importance.

We are not here to discuss only the Missouri Valley, even though we realize the Missouri Valley and the problems of the valley are of vital importance to the people living here. It doesn't make any difference in what watershed we live, we feel that our own watershed is the most important, and of course it is to us.

This committee, which represents the Agricultural Committee of the Congress of the United States, is charged with the responsibility to all the sections of the Nation. Everybody has floods. The great floods here in this area and those a little east of here, have of course attracted Nation-wide attention in recent months, and very properly so, but there have been floods in other parts of the Nation and there will be in other parts of the Nation. The floods come at various times in various places, so we must not get the idea that our efforts to deal with the problem of floods is any sectional problem or one confined to any one particular area.

The Missouri Basin happens to be the area which is now attracting attention, and for that reason we are giving the greatest attention to it right now. I want, of course, to give attention to that problem right now, but just at this moment, a member of our committee from

Kansas is coming in. Ladies and gentlemen, I want to introduce the Honorable Cliff Hope, from Garden City. [Applause.]

Before I turn this meeting over to him, I want to continue just long enough to say that this committee is attempting to study the problems of flood prevention. I like to call it flood prevention instead of flood control. We have long talked about flood control, but it is my belief that flood prevention is the better description. We held a hearing on this same subject down in Texas 2 weeks ago, and some of the witnesses remarked they didn't like the name of flood control, and that they would rather call it flood prevention. They have convinced me they were right and what we should talk about, as far as the agricultural activities in connection with floods, is the matter of flood prevention the matter of making the water sink into the soil where it falls. After all, the water that sinks into the soil where it falls, is not going to destroy land, people, industry, or homes somewhere below. It is the water that runs on the surface of the ground that causes floods; it is the water that runs on the surface of the ground that causes erosion; it is the water that runs on the surface of the ground that creates the great damage, as the result of too much rainfall. So, to the extent you can make water sink into the soil, you have converted that danger into a great blessing. You have conserved that water to use against the time of drought when you will need it.

So, our efforts in connection with what sometimes has been called the agricultural flood control problem, the thing I like to call the soil conservation flood prevention program, is directed at preventing the occurrence of great floods.

Now, I am not one of those who believe it is possible to put a sponge all over the United States and say that everyone can be assured that there will never be another flood. We know, that before there was an acre in Kansas broken up by a plow, there were floods. We know that the river valleys were cut by running water and floods.

Yesterday, this committee was out in the State of Colorado, and we saw some of the great canyons cut out, and that was done by running water. We have had floods and will continue to have floods, but we know it is always the last foot or even the last inch of the flood that causes the great damage, and if we can prevent that last foot of water from overflowing the lowlands, we have done a great work for the lowlands. If we can make that water sink into the soil in the upper regions of the streams, we will have better stream control and better runoff. So, you can reasonably anticipate better agricultural crops in the upper stream region, as well as the lower region. And, that to my mind is the great difference between the program of the Department of Agriculture in their efforts to prevent floods, and some of the other programs which are merely flood-control programs.

This program that we are interested in as an Agricultural Committee, contemplates preventing floods by treating the upper reaches of the streams, before the floods have accumulated.

And I think most of you are acquainted with the fact that the Department of Agriculture, through the Soil Conservation Service, has a program of flood prevention or flood control. How far that program should be extended is something the Agriculture Committee must pass upon. The Department has made surveys of various basins in the United States, and has submitted them to the Congress, and

there the Congress must determine whether or not it will authorize the work that the Department of Agriculture recommends, just as the Congress passes upon whether or not it will authorize the recommendations of the Army engineers for the flood-control programs.

We want it understood that this committee is not coming here to condemn anybody in his work. We have no dispute with anybody. We are simply interested in finding how far the Department of Agriculture should go; how much public money we can properly and profitably spend on this program; how much can the taxpayers properly afford to invest in a program of this kind. Unless the program pays dividends, we as Members of Congress ought not to impose a financial burden on the taxpayers of the country. If the program results in substantial savings that many people believe it will, we should expand it. Not only in the Missouri Valley but in many other valleys. It isn't possible to do it all over the United States at one time. We must learn something of the relative needs of the various sections of the country.

Those are some of the things this committee hopes to learn by visiting in various sections of the country where we can talk to people who cannot be in Washington to talk with us. We know it is impossible for you people to come to Washington, and we believe this is the best way to get your ideas. We know you have more intimate knowledge of the subject than we could possibly have; so, in order to understand the needs of this great area, we decided to visit in the area itself.

So, the committee will welcome discussions from those who have ideas or views they want to express on how we should seek to prevent floods in this area, how far we should go, what areas to be covered, and how much to spend, and the extent of our activities.

Now, I haven't had time to talk with Congressman Hope, but I do want to turn this meeting over to your own member of this committee; but I believe, before I do, I want to take it on myself to introduce the other members.

So as to make you folks feel at home, I want to say that we have your own local Congressman present. He is not a member of this committee which is here today, because he serves on another committee of the House. We have the Honorable Wint Smith from this district of Kansas. [Applause.]

And we have your neighbor from just across the State line here to the west, who represents the area immediately west of you, Mr. William S. Hill, from Fort Collins, Colo. [Applause.]

And now without telling him so, I am going to turn the further proceedings over to the former chairman of the Agriculture Committee of the House, a gentlemen who represents the southwest part of this State of Kansas, and a man who has served on the Agriculture Committee more continuous years than any other member of that committee, and who has the admiration and affection of every member of the committee, regardless of politics. Now, you might guess my politics since I am from Texas. [Applause.] I don't think we draw that sort of line on our committee. [Applause.] I want to ask the Honorable Cliff Hope, of Garden City, to take over and preside at this meeting. Mr. Hope, will you just take over please? [Applause.]

Mr. HOPE. Mr. Chairman, ladies, and gentlemen, I very much appreciate the courtesy of our distinguished chairman in asking me to

preside at this meeting. Of course, I am happy to do so. I am not going to take any time to add anything to the very fine speech that our able and distinguished chairman has made. I agree with it wholeheartedly.

I am sure that he is familiar with our problems, because they are not too much different from his own State of Texas and his own congressional district. Likewise, Congressmen Hill and Smith are clearly familiar with the problems of this area, problems as far as flood prevention and flood control is concerned, quite different from those of other sections of the country.

We also have a good many local problems as will be brought out in the hearing today. They are not problems that are tied up necessarily with any national system of flood control, or with any basin system of flood control, because in many cases they involve local situations, and yet they are important. They are important in the over-all picture of agriculture production and conservation of the soil of this country, and they fall particularly, I think, within the scope of the activities of this committee; that is, in the agricultural flood-prevention program, which our chairman has already pointed out to you is concerned primarily with flood prevention and the treatment of the land and the small tributaries of the larger streams. Whatever activities may ensue out here under that program will not be spectacular projects but minor projects when you contrast them with larger projects throughout the country.

I say that fits in particularly with the activities of the committee because it deals with the land and small tributaries and treatment of the land. Those are the things with which this committee is concerned. I don't think there is any conflict of interest between this sort of program and the reclamation program and flood-control program on the larger streams. However, I do think we have reached a point in the programs where it is necessary to coordinate the Pick-Sloan plan and the agricultural program. There is no conflict, as I see it. It has been devised and developed without too much consideration that there are two problems and two programs. And I am hoping that, in the course of these hearings, we will be able to develop ideas which should be considered in coordinating these programs.

Now, without any further statements, Mr. Chairman, unless you have something further, we will proceed.

The CHAIRMAN. I think it would be advisable before we start to have the staff member, Mr. Heimburger, read the list of witnesses who have given their names to the committee.

(At this time the names are read and announcement made that anyone else who wishes to participate is invited to do so.)

Mr. HOPE. The committee will proceed at this time. We will now hear Mr. Gladwin Young, special representative of the United States Department of Agriculture, from Lincoln, Nebr. Mr. Young has been working on the Missouri Basin program for some time. He is here to discuss briefly the over-all picture of the Missouri Basin program. We want Mr. Young to lead into this thing and give us his ideas as to what this program embraces. Then we will proceed with the witnesses who will discuss specific projects. I hope it will not be necessary to limit the time as we go on, but that may have to be done in order to be fair to everyone. Mr. Young.

STATEMENT OF GLADWIN YOUNG, REPRESENTING UNITED STATES DEPARTMENT OF AGRICULTURE FIELD COMMITTEE

Mr. YOUNG. Mr. Hope, chairman, and members of the committee, the interest of your subcommittee of the House Agricultural Committee in land and water-resource problems is indeed encouraging and greatly appreciated by all of us in the Department of Agriculture who live and work in the Missouri Basin area.

Many people are thinking in terms of the Missouri Basin as well as in terms of their immediate watersheds. The Missouri Basin Inter-Agency Committee, representing the voluntary efforts of the Federal Government and States governments, is using its influence to develop for the Missouri Basin a program that will make full and productive use of the land and water resources of the basin. The impacts on agriculture and on farm people of this tremendous program are already evident. For example, if full use is going to be made of the tremendous investments in new irrigation, new sources of hydroelectric power, or land protected from overflow of the Missouri River by giant levees—farmers are going to do it.

If the large investments being made by the Nation in huge dams and other engineering works are to be fully protected, farmers who own and operate the watershed lands are going to do it.

These are some of the reasons why farm people are expressing a direct concern with the relations that exist between the development of the water of the Missouri River and the conservation and use of the watershed lands of the Missouri Basin.

It is obvious that water-resource development and land-resource development are not two separate things, and that both must be taken into account in river-basin planning, just as they must be taken into account in small watersheds on individual farms.

Before discussing further the proposal of the Department of Agriculture for a Missouri River Basin agricultural program, it might be helpful to look at some of the characteristics of the Missouri Basin.

As has been pointed out previously, the Missouri River Basin is a large area with 326 million acres draining into the Missouri River and its tributaries. As shown on the map, 10 States or parts of States are included within its boundaries.

As shown on the map before us, the Missouri Basin sits astride a transition climate zone ranging from humid in the lower basin to semiarid in the upper basin. On the map these zones appear to be fixed; but, as a matter of fact, they are not. The possibility of extreme variations in rainfall must always be contended with by those who operate the farms and ranches. Plans must always be made against the possibility of both drought and flood-producing storms. History has convinced those who live here that both drought periods and floods will continue to come to the Missouri Basin. Improvements in techniques of managing the land and water resources have also convinced those who use the land that the disastrous effects of droughts and floods can be reduced.

In the Flood Control Act of 1944, certain major features of Missouri Basin development were authorized. Since that date, more than a billion dollars of Federal funds have been expended for planning and

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constructing certain of those features having to do with control and use of waters of the river and its tributaries.

The program authorized in the 1944 Flood Control Act for the Missouri Basin, popularly known as the Pick-Sloan plan, has been referred to as a comprehensive and coordinated program for the Missouri River Basin. As a matter of fact, it is not a comprehensive river basin program. It is comprehensive only with respect to orderly control and multiple use of water after the water has run off the watershed lands and has become a part of the flow of the rivers.

The Nation's specially authorized program for the Missouri Basin is therefore a program to control, develop, and use the waters of the Missouri River and its tributaries. In my opinion, the Nation's program for the Missouri Basin will continue to be out of balance in its planning and in its development until specific legislative provision is made for the agricultural and forestry watershed phases to be planned and carried out coordinately with the engineering phases.

The Department of Agriculture has since 1945 attempted to coordinate its work with the engineering phases of river development. The Department of Agriculture has maintained membership on the Missouri Basin Inter-Agency Committee and has participated in its activities and efforts to bring about fully coordinated and unified effort. It has become more and more certain, however, that the acceleration of needed work on watershed lands to keep pace with the rapidly expanding work under the Pick-Sloan part of the program could not be accomplished without specific authorization from Congress.

A request for authorization of such a program is contained in the Missouri River Basin agricultural program, House Document 373, Eighty-first Congress, first session.

The program includes those additional measures necessary to provide for an integrated and balanced program of development, conservation, and use of the land and water resources of the Missouri River Basin. The watershed program when authorized will complment the flood-control, navigation, irrigation, and electric-power projects approved in the Flood Control Act of 1944 and other legislation.

The program would be carried out cooperatively by the United States Department of Agriculture, the States, and the land-grant colleges with the 582,000 farmers and ranchers of the basin, and through soil-conservation districts, watershed districts, and other organized farmer groups. The public will share with private landowners an equitable part of the cost of installing that part of the program in which the public has a stake. Farmers and ranchers will be given assistance in the form of direct aids, technical assistance, including surveys and investigations, education and information, and credit. The program provides for necessary measures to achieve maximum public benefits from public lands under jurisdiction of the Department of Agriculture. The recommended program provides for—

(1) Application of conservation and improvement measures on grassland and cropland to maintain or increase production, reduce erosion, floodwater, and sediment damage. Such measures include contour farming, terracing, grassed waterways and outlets, erosion-control structures, livestock water facilities, and seeding and reseeding of grass and cropland.

(2) Development, management, and use of forests and forest ranges to increase the multiple benefits from these natural resources. These benefits come from the production of timber for lumber and other wood products, the use of ranges by livestock and wildlife and the establishment of recreational opportunities. In addition, good forest cover serves to preserve sources of water supplies in the mountainous areas, stabilize soil, and retard the rapid runoff from snow-melt and high-intensity rainstorms.

(3) Stabilizing measures for small watercourses or flood reduction measures to assure the safe disposal of water in small watersheds and the lesser tributary streams. This can be accomplished through the construction of gully-control structures, floodways, bank protection works, and small retarding basins for flood reduction, for protection of public investment in large reservoirs and other works, and for protection of land being destroyed by gully-erosion, bank cutting, swamping, and sedimentation.

(4) Assistance in the development of irrigation included in the program authorized under the Flood Control Act of 1944 and in development of other irrigation by State and private projects. At this point I should like to emphasize that the program proposed for the Missouri Basin by the Department of Agriculture is not confined to the problem of flood reduction. We have a responsibility in the field of irrigation which we believe should be carried out in cooperation with farm people and other agencies of Government, particularly the Bureau of Reclamation, having responsibility for irrigation development. I call your attention to the map before us on which is delineated an area of almost a million acres in South Dakota in the proposed Oahe irrigation project in which irrigation may be developed in the future. I am also pointing to an area in the proposed Missouri-Souris project in North Dakota in which more than 1 million acres is proposed for irrigation. The Department of Agriculture has responsibilities to the farm people in these areas to assist with the transition from dry-land farming to irrigation farming. In connection with the 5 million acres already irrigated in the Missouri Basin, the Department of Agriculture has a responsibility to assist farmers in making most efficient use of irrigation water and irrigated lands.

I should like to emphasize again that the Missouri Basin agricultural program is not concerned alone with the matter of managing watershed lands for the purpose of flood reduction. We are equally as concerned with the management of watershed lands to prevent disastrous effects of drought. That means efficient development of irrigation as well as effective moisture-conservation measures on the tremendously large part of the Missouri Basin on which adequate moisture will always be a problem.

(5) Rehabilitation and improvement of existing drainage systems and the construction of new systems for areas not now properly drained, including drainage systems for the farm lands which will be protected by levees authorized in the Flood Control Act of 1944. It is not intended to drain areas whose most beneficial use is for the preservation and enhancement of wildlife resource and for recreation. I would emphasize that the problem of drainage in order to bring about efficient use of land is as important in its place as is the problem of reducing flood damage or developing irrigation.

(6) Soil surveys and land classification showing the characteristics, productivity, and location of soils to facilitate efficient development, conservation, and use of the land and water resources of the Missouri Basin. A part of this job has already been done, but there is need for accelerating it to keep pace with the needs for this information to guide tremendous investments of both public and private funds for irrigation development.

(7) Research and investigations to guide and direct the expanded program of land, forest, and water development so as to assure full completion of recommended action program with the least amount of costly trial and error. I will not comment further on the need for research, since this point is going to be discussed today by a representative of the agricultural experiment stations of the Missouri Basin.

(8) Cooperative extension education to develop understanding and active participation in the program of farm families, farm groups, civil and commercial organizations, local, county, and State institutions, and Government agencies. This point was emphasized at the hearings at Colby by Mr. Griffith speaking for the directors of the agricultural extension services in the 10 Missouri Basin States.

(9) Development and readjustment credit not available under the standards and authorities of present lenders, as necessary to cover requirements of farmers for farm acquisition, improvement, and operation; and of groups of farmers for water facilities, soil- and water-conservation facilities, and marketing and processing facilities. This credit should be made available at times and places to enable farmers to develop their lands concurrently with public programs.

(10) Assistance to rural electrification borrowers in developing plans for extending service to the more sparsely settled farming areas and to make certain that activities under the national rural electrification program are properly related to the basin-wide development program.

To carry out the purposes of this program, the Department of Agriculture will annually submit work plans, surveys, or statements giving the details of the proposed work in selected watershed areas. In selecting watersheds that will be given priority for work plans under the Missouri Basin agricultural program, consideration will be given to the national need for agricultural products, the land, forest, and water problems and potential production capacities of the area, the construction plans for Federal projects authorized under the Flood Control Act of 1944 and subsequent legislation, and the ability and willingness of local people to carry out their responsibilities on the proposed work of improvement.

No new agencies will be required to carry out this program. The following nine bureaus are now carrying out some portion of it under provisions of the Nation-wide agricultural programs and will be responsible for carrying forward the accelerated watershed program recommended for authorization:

Agricultural Research Administration
Bureau of Agricultural Economics
Extension Service
Farm Credit Administration
Farmers Home Administration
Forest Service

Production and Marketing Administration
Rural Electrification Administration
Soil Conservation Service

In conclusion let me point out again that we are proposing that specific plans be worked out for each watershed and that the program be carried out in cooperation with farmers and ranchers, and with their soil conservation districts, irrigation districts, drainage districts, and watershed districts. We are proposing that action be taken that will permit the acceleration of these important watershed functions in the most critical watershed areas in the basin. The same measures or concentration of effort is not needed in all parts of the basin. We would propose, therefore, to initiate this effort on a selective basis and in critical watershed areas within the basin. We are hoping that a way will be found to provide for stepping up the job in the right places and at the right time to accomplish the goal of a coordinated program.

What we are proposing is not in conflict with the Pick-Sloan part of Missouri Basin development, nor is it a substitute for that important part of the total job. What we are seeking is a way to bring into proper balance the agricultural phases of development with the engineering phases so that the Nation's total investment in developing, conserving, and using efficiently the land and water resources of the basin will yield the greatest possible returns.

Mr. HOPE. Thank you very much, Mr. Young. Will you remain for just a moment? Perhaps there are some questions the members of the committee would like to ask you.

Let me ask you one: There are present today a number who are from the Arkansas Valley area. It is my understanding at this time that a study is being made by the Army engineers, the Bureau of Reclamation, Soil Conservation Service and other Government agencies, of the Arkansas Valley Basin, in which all the agencies are working together. When the report is filed, it will, as I understand it, cover an integrated program including all phases of water and soil conservation. Am I correct in that assumption?

Mr. YOUNG. That is exactly correct.

Mr. HOPE. I understand it may be 2 years before the report is filed. And it will differ in this sense from what has been done in the Missouri Valley, in that the report will include all the programs that should be considered in connection with a valley development study.

Mr. YOUNG. That is correct.

Mr. HOPE. Are there any questions?

The CHAIRMAN. I haven't been sure that we have been following the right track in attempting to include an area as large as the Missouri Valley in one project of this kind. Obviously, the entire Missouri Valley and the United States deserves attention, but it is equally obvious the Congress of the United States, representing the taxpayers, is not going to put up enough money at one time to include the entire area. You have suggested in your statement, and I think very properly, that there are certain watersheds that are critical. That probably accounts for a great deal larger percentage of the damage resulting from the floods. Is it the present feeling of the Department of Agriculture that it is advisable to undertake the entire project on

one-sixth of the land of the United States at one time, or would you feel that it might be part of good judgment from the standpoint of getting results, of seeking authorization on a number of smaller but most critical areas, with the idea of ultimately, of course, covering the entire area as rapidly as we can?

Mr. YOUNG. I am not certain that I can answer your question, particularly as it pertains to the authorization. However, I agree with what you imply in your statement that it would not be feasible or correct to undertake a program over one-sixth of the United States. That is not what we are proposing. We are proposing that there are within this area of the Missouri Basin certain critical watershed areas, in which there should be an acceleration of activity, functional acceleration, which is beyond the present scope of the Department of Agriculture to carry out.

Some of those areas are critical for different reasons. Some of them relate very directly to the programs of the Bureau of Reclamation and the Army engineers. For example: Let us say a several-million-dollar reservoir is built to retard the siltation in the watersheds above that reservoir. There are reservoirs which are built where the siltation rate is very high and some where it is very low. In those areas where the siltation rate is high there is immediate need now for a program in cooperation with the landowners of the watershed area to reduce the rate of siltation, and that should begin promptly.

The CHAIRMAN. Unless we protect the land above the large reservoirs, the reservoirs won't protect the people below them; is that right?

Mr. YOUNG. That is the case, of course. I would say in further answer to your question Mr. Poage, that since the Nation has designated the entire Missouri Basin as a critical area, and has authorized two other departments of the Government to begin projects to protect the basin, it might be feasible to authorize a program for the Missouri Basin, and then to bring in bit by bit, piece by piece, or watershed by watershed, the program that should be carried out in relation to the critical factors existing; part of which are the construction programs underway by the other two principal functioning agencies of Government.

Mr. HOPE. Mr. Hill has a question or two?

Mr. HILL. First look at your map. That is the most interesting map you had on the chart to me. If the gentlemen on the stage will run the ruler down to the southwest corner of the map, you will see the second congressional district of Colorado almost entirely within that section. In looking at the map I want you to notice the little streams starting in the southwest corner of the map. To me, those are the most wicked streams in the area. When they start down that slope they take everything with them. And, of course we dump all of that down on Kansas. We have been doing that for a hundred thousand years.

We spent Sunday where he is showing you now, where the beetles are taking out the forests, and all you need to do is to have a fire and we will dump 8 or 10 more inches down on top of you folks. Mr. Young, you say that the water runoff is for a period of 5 years. How come you don't have from 1943 to 1951?

Mr. YOUNG. Mr. Hill, the figures for this map were prepared by the United States Geological Survey and published in their reports.

It may be that they have published later reports since that date. I can't answer as to whether or not they have published figures from that point on. We took that map from a published report of the United States Geological Survey.

Mr. HILL. How reliable do you think it is to have only 5 years? You might catch a 5-year period when we won't dump any water down on you. It is an interesting map to look at. However, I am not sure you have a long enough period to build a permanent program by a map that contains only 5 years.

Mr. YOUNG. The map is valuable, not from the absolute figure of inches of runoff, but from the relative runoff from one area to the other. That is the value of the map. It is also useful to show with a rather broad brush the high mountainous areas where the large contributors of runoff to streams for irrigation and other uses are located. And it is the relative runoff that is important on this map.

Mr. HILL. Another question: It pertains to one of the things that has bothered me for the last 10 years. This particular area I have in mind is 1 of the 11 we have been working with the Army engineers on. If the gentleman on the stage will put his ruler down in the section where I live. I don't care how good the dams are. You build a dam and then you fill the dam full of water. Then, the flood comes along and the dam and the water all will go downstream. I have been arguing with some of the folks in Washington for 10 years trying to tell them the dams should be built in the mountains where they will hold the water. Is that true?

Mr. YOUNG. I think that is a correct observation that any storage dam or any dam that is built to retard water protects only the land below it, and the higher up you can build those dams, the more effectively your protect the land below them, providing of course the storage capacity is adequate to store the water above them.

Mr. HILL. Suppose you build the dam and store the water. Then, the flood comes above the dam; out goes the dam and the extra water you held behind the dam.

Mr. YOUNG. Of course I think you are asking an engineer problem that I am not confident to answer.

Mr. HILL. When the flood comes, that is real danger, but if you don't let them fill up the danger is lessened. If you are going to build the dams you are going to find it necessary to have someone controlling the water which piles up behind them, and that group of people must have absolute control of the dams. I happen to know of a few cases where this came up. If you fill that dam full of water and the thing goes out, everybody below is going to suffer. Now, how is this going to be remedied? Who is going to say when the water comes out of the dam? Are you going to let the farmers say? I know what they will say. Pile the water up so we can use it on the alfalfa. So, they pile it up and then the dam breaks. These floods don't come where you want them or when you want them; they come when and where they please. If people are going to make rain, they will come where you don't want them. What am I going to say to a farmer down below? Am I going to tell him that you aren't going to pile that water up above? Take for instance a flood comes 40 miles above the dam when it is two-thirds full of water—out goes the dam. We are assuming they are not smart enough to build them good enough. What are you going to do in that respect?

Mr. YOUNG. I think you are directing an engineer problem to an agriculture man without the background to answer the particular question you are asking. The Bonny Dam, of course, was built. I am just using that as an illustration.

Mr. HILL. We are going to find it necessary to think about this. I say if you are going to build the dams, some authorization must be made on how they are going to be controlled; how they are filled and how the water is to be let out of the dams into the lower regions.

Mr. HOPE. Mr. Patten, any questions?

Mr. PATTEN. No; I don't believe so.

Mr. HOPE. Mr. Smith, any questions?

Mr. SMITH. No questions.

Mr. HOPE. We thank you very much, Mr. Young, for your statement.

(A voice from the audience.)

Mr. HOPE. You want to ask a question?

Mr. GARVEY (from audience). Yes, I do. I would like to ask why some of the money allotted to the PMA is not used in these counties for the construction of dams. That is what it was earmarked for. Why hasn't that program been started on the farms and ranches? That would be part of the watershed program, wouldn't it? If the watersheds are important, why are not the funds used up that are available to the farmers?

Mr. YOUNG. I couldn't answer the specific question he is asking. I think if he would inquire from Harvey Bross, State PMA member, that he might be able to answer the question for you.

Mr. HOPE. Yes; if you will get in touch with Mr. Bross, I am sure he will discuss it with you. If you find out something which develops into a discussion problem, we will put you on the witness stand and you can tell us all about it.

The next witness is Mr. J. Floyd Breeding, of Rolla, Kans., president of the Western Kansas Development Association. Mr. Breeding.

STATEMENT OF FLOYD BREEDING, PRESIDENT, WESTERN KANSAS DEVELOPMENT ASSOCIATION, ROLLA, KANS.

Mr. BREEDING. Mr. Hope, Mr. Chairman, members of the committee, ladies and gentlemen——

Mr. HOPE. Mr. Breeding, I am going to suggest that in your opening statement you tell us something about the Western Kansas Development Association.

Mr. BREEDING. First, I want to give you honorable gentlemen a welcoming address. We are proud of having you in western Kansas, and I believe the people of Colby are proud to have you here, so that we can present the problems which we have been bothered with recently.

My name is Floyd Breeding, and I am president of the Western Kansas Development Association. I want to say that is an association of western Kansas counties—I believe there are 46 in number. Our principal purpose is to work as a chamber of commerce, promoting the general welfare of all the people. We believe in promoting agriculture and businesses of all kind, we are helping to promote the general welfare and are helping to strengthen the economy of this area.

This association has stood consistently for the widest application of soil conservation practices of all types, because its officials and members

are well aware of the fact that ours is an economy based on agriculture, and that the condition and value of our soil underlie our every activity and hope. That soil is our capital, and we realize that if it is dissipated, by whatever means, we lose the basis of our livelihood and, in addition, jeopardize the futures of our children and their right to live, as we have, on and by the land. We realize, perhaps belatedly, that the land is only in our trust, and that we have a moral obligation to leave it in as good, or better, condition than we found it. There are no more frontier lands, and no longer can we use up and waste our soil, then move on to virgin sod to repeat the process.

The individual farmer can, through careful planning and enlightened cultivation practices, do much to preserve the precious topsoil. But in most cases, he cannot do this alone. He needs the technical assistance of engineers and soil scientists. In most areas, and certainly in our region, these are available only in the Government agencies, particularly in the Soil Conservation Service. Also, he must have the cooperation, in most instances, of his neighbors, because the topography of our lands was not laid out by the Creator on the basis of section lines and ownership maps.

In addition he needs the cooperation of his neighbors in a wider sense because runoff water, the basic agent of all erosion and of widespread flooding such as we have had in western Kansas not only this year but almost annually, is no respecter of State lines. Much of the water that has wrecked Kansas farms, bridges, and homes fell as rain in Colorado. The relatively sharp slope of the Colorado plains helps to speed the flow of this runoff, and by the time it enters Kansas streams what Shakespeare called the gentle rain from heaven has turned into raging torrents. That is the chief reason that we need the interstate planning and coordination that the agencies you gentlemen, through the Congress, set up and control. Your committee, through its recommendations to the full Agricultural Committee, can implement the plans already laid out under the Soil Conservation Act and other legislation already passed.

One of the immediate needs is expanded technical assistance. As the situation stands now in western Kansas conservation districts, the backlog of applications for engineering aid is growing rather than decreasing. Without such aid, it is almost impossible for farmers to run levels, to stake out terraces and to plan other work designed to hold the water on the land where it can be best used.

I want to refer only briefly to the relationship between our area needs and the flood situation in the major rivers of Kansas, Missouri and Oklahoma. Every bit of water and silt that can be held in the upper reaches of the small streams which eventually form the big rivers is subtracted from the total volume of the big rivers in flood. In working toward good management and improvement in our own local water control programs, we are partly solving the problems of flood control in the down-stream cities and farm areas.

Working with these other areas to coordinate all phases of water control, we can go a long way toward insuring beneficial use of a great volume of rainfall, and can provide at least partial insurance against repetition of the uncontrolled havoc which resulted in such startling loss of life, property and productive capacity both on farms and in the cities.

As an organization, we realize we must try to help do something about the loss of top soil in the way of water erosion and wind erosion. Not only for the present generation and the economy of the country at the present time, but for our grandchildren who will be here 100 years from now.

It is indeed an honor to be here today and try to enlighten you gentlemen so you can endeavor to do your best efforts in Congress that will help to retain the economy of this country.

Mr. HOPE. We thank you very much Mr. Breeding for your statement.

Our next witness is Mr. L. C. Aicher, superintendent of the Hays Branch Experiment Station, who has exchanged places on the list with Dr. M. C. Cunningham, president of Fort Hays State College, due to the fact Mr. Aicher finds it necessary to leave for another meeting.

STATEMENT OF L. C. AICHER, SUPERINTENDENT, HAYS BRANCH EXPERIMENT STATION, HAYS, KANS.

Mr. AICHER. Mr. Hope, Mr. Chairman, and gentlemen of Congress. I wish to submit this information which is a summary of the water runoff and loss of top soil by erosion, obtained from plots at the Hays Station from experiments carried on from 1930 to 1947, inclusive.

(The table referred to is as follows:)

Summarized water runoff and loss of soil by erosion data obtained from control plots at the Fort Hays Branch Experiment Station during investigations carried on from 1930 to 1947 inclusive (land on a 5-percent slope) [1]

Treatment	Length of slope	Average annual loss of water by runoff when farmed				Annual average loss of soil by erosion when farmed	
		Down slope 1930–38		Across slope 1939–47		Down slope 1930–38	Across slope 1939–47
		Percent lost	Inches lost	Percent lost	Inches lost	Tons lost per acre	
Continuous wheat on short slope	36.3	13.21	2.58	8.96	1.98	4.132	2.739
Continuous wheat on long slope	145.2	11.31	2.21	5.52	1.22	4.459	1.439
Continuous wheat on medium slope	72.6	12.13	2.37	5.52	1.22	4.024	1.584
Wheat on fallow in rotation with kafir	72.6	15.78	3.09	7.15	1.58	12.800	4.592
Fallow for wheat in rotation with kafir	72.6	12.52	2.45	6.79	1.50	4.240	1.507
Kafir after wheat in rotation with fallow	72.6	19.24	3.76	4.30	0.95	15.833	2.027
Continuous kafir	72.6	16.80	3.29	4.39	0.97	14.405	2.230
Continuous wheat on desurfaced soil	72.6	15.59	3.05	6.74	1.49	6.944	1.998
Native grass clipped to simulate grazing	72.6	6.13	1.20	0.86	0.19	0.445	0.058
Native grass never clipped	72.6	0.24	0.04	0.05	0.01	0.031	0.009

[1] Land farmed down the slope from 1930 to 1938 inclusive. The same land farmed on contour across the slope from 1939 to 1947, inclusive.

Average annual rainfall 1932 to 1938, inclusive was 21.4 inches.
Average annual rainfall 1939 to 1947, inclusive was 23.54 inches.

Mr. AICHER. These results obtained in the investigations in Soil Conservation over a period of 18 years at the Fort Hays Experiment Station, on land having a 5 percent slope, show very definitely that terracing and farming land on contour greatly retards runoff of water and loss of soil by erosion.

The results also show the effectiveness of grassed areas in preventing loss of water by runoff and loss of soil by erosion.

The application of modern soil conservation methods on entire watersheds would hold much of the water where it falls and retard runoff to the extent that floods on these watersheds would not be cause for concern, soil erosion would be greatly reduced, silting and filling up of reservoirs and lakes with eroded soil is avoided, and increased production of crops and grass would result from the increased water stored in the soil.

Mr. HOPE. We thank you very much, Mr. Aicher. I think you have submitted some very significant figures to the committee. Are there any questions at this time?

Mr. SMITH. Mr. Aicher, what would be your best judgment as to the result of burning of pastures each spring?

Mr. AICHER. It would increase the runoff and lose some soil on the pasture. There is no question about it.

Mr. HOPE. Again we thank you, Mr. Aicher, for your statement.

Our next witness is Dr. Porter Ahrens, president of the Kansas Reclamation Association, Scandia, Kans.

Dr. Ahrens.

STATEMENT OF DR. E. PORTER AHRENS, PRESIDENT, KANSAS RECLAMATION ASSOCIATION

Dr. AHRENS. Mr. Chairman and members of the committee, and Congressman Smith. My name is E. Porter Ahrens. I am making this statement on behalf of the Kansas Reclamation Association, of which I am president.

This association has been in existence for over 12 years, and is dedicated to the stabilization of agriculture in Kansas by the control, conservation, and utilization of flood waters.

At our last annual meeting held in Salina, Kans., September 20, 1951, this association passed a resolution endorsing acceleration of the soil-conservation practices and land-treatment program as proposed in the Missouri Basin agricultural program.

From the beginning of our activities we have thoroughly realized the fact that such land-treatment practices are an absolute necessity, not only in the Missouri River Basin, but in every watershed basin in the United States, if America is to remain strong and continue to feed herself as well as other nations of the world.

History will show that nations have fallen when they lost their soil, and we cannot afford to let America fall into this category.

The soil conservation practices and land treatment proposed in the Missouri River agricultural program is one phase of the Missouri River Basin development or Pick-Sloan plan, and will require the greatest number of years for completion of any one phase of the basin development, in fact the agricultural phase of the Missouri River Basin development plan has such tremendous ramifications and possibilities, it will never be said the job is done; it must be continuous.

Some groups or factions in Kansas make claims, and would have the public believe that all floods could be prevented by watershed treatment, retention dams, and such conservative measures. With this idea we vigorously disagree.

The Department of Agriculture plan is along the line of flood control and silt prevention on the watersheds, but cannot be made to substitute for the larger dams on the tributaries and main streams,

to be built by the United States Corps of Engineers, and the Bureau of Reclamation. Such an assumption is preposterous and would be a physical impossibility.

The Republican River is the largest contributor to the Kansas River, and was the first tributary basin in the Missouri Basin, to have thoroughly coordinated plans by the Bureau of Reclamation, the United States Corps of Engineers and the Department of Agriculture. These agencies are doing a magnificent job, and the same thing can be accomplished in all other tributaries if only Congress will provide the funds. We commend these presently existing agencies, and oppose the creation of any new Federal agency, or the putting of activities of all these agencies under any one now existing agency.

I wish to repeat, we indorse the Missouri Basin agricultural program as a phase of the Missouri Basin development, and not a substitute for the plan or work of the United States Corps of Engineers and the Bureau of Reclamation, and it is our earnest contention that had the authorized Pick-Sloan plan of the Kansas River Basin been completed the record-breaking disaster of 1951 would have been averted. The loss in this 1 year would have paid many fold the cost.

I ask permission at this time to file a copy of a release under date of April 25, 1950, of a statement of Mr. A. E. McClymonds, regional director for Soil Conservation Service of Lincoln, Nebr. With your permission I file this with my statement. I thank you.

(The matter referred to is as follows:)

When Congress amended the Flood Control Act of 1936 to include authorization for work on watersheds and small tributaries the intent was that this should supplement, not substitute for, the major engineering operations in the rivers and major tributaries, A. E. McClymonds of Lincoln, Nebr., regional director for the Soil Conservation Service, in his talk here today before the Kansas Land and Water Conservancy Association.

"Actually," he said, "the job of the Department of Agriculture follows closer along the line of flood control and silt prevention on the watershed lands, while the major engineering operations of the Corps of Army Engineers follows more nearly along the line of control of floods—after the water gets down into trunk stream channels.

"This," he added, "makes a perfect fitting together of the two phases of a comprehensive, completely coordinated program of flood control."

Amendment to the Flood Control Act, he explained, did not come by chance. Instead, he said, it followed a good deal of discussion between the Secretary of Agriculture and Secretary of War.

Accordingly, authorization for the Department of Agriculture to conduct "Federal investigations of waterways and measures for runoff and waterflow retardation and soil erosion prevention on watersheds" was included in the same act in 1936 that authorized the War Department to continue its flood control work.

"The program of the Department of Agriculture is designed primarily to reduce damages on the watershed," Mr. McClymonds said, "and should not be considered as a means of eliminating flood flows in major drainage ways.

"If, in a flood reduction program, we can force this water, or even a considerable part of it, to delay its race to the sea," he added, "we have won a part of our objective. Our aim, then, is to hold back as much as possible of the surplus water so as to reduce the height and destructiveness of floods.

"But we in the Soil Conservation Service do not claim that we can control major floods with our kind of work alone. Some of the peak flow can be cut down, and this will help. For the heavier floods, however, there will be needed additional controls in the way of reservoirs, levees, and other main channel operations."

Responsibility for the flood control investigations was assigned to the Soil Conservation Service in watersheds composed principally of agricultural land, and to the Forest Service in watersheds which are composed principally of forested land. By far the greater part of the investigations in the Missouri River Basin is the responsibility of the Soil Conservation Service.

Mr. McClymonds explained how the proposed watershed flood control operations would fit in with the soil and water conservation operations that are now being carried on through soil conservation districts on the individual farms and ranches.

Among things still needed, Mr. McClymonds said, are a comprehensive inventory of the soil and water resources and the conservation needs, and a speeding up of research and field studies to increase the effectiveness of soil and water conservation practices and measures applied to the land.

The flood control survey of the Missouri Basin has been completed, he concluded, and the recommendations made by the Soil Conservation Service are included in the comprehensive report and plan for complete development of all agricultural resources of the basin, prepared by the Department of Agriculture. Actual operations now await authorization by Congress and appropriation of the necessary funds.

"This program of watershed improvement is good business," Mr. McClymonds concluded. "When any of us invest our money in an enterprise, we want it to be a safe investment, and we want it to yield a reasonable return.

"This program is good business for the farmers and the ranchers, and it is good business for the merchants and professional men—it is good business for everybody—in the communities involved.

"The measures used in this program fit in well with routine Soil Conservation district soil-conservation measures. Together these programs protect land, crops, livestock, and buildings. They aid in holding and building up soil fertility. They often increase production, and make farming operations easier."

Mr. HOPE. Doctor, if I understand you correctly, you see no conflict between the Missouri Basin agricultural program and the so-called Pick-Sloan plan?

Dr. AHRENS. I see no conflict whatever between them.

Mr. HOPE. You see no conflict between the plans themselves?

Dr. AHRENS. That is correct.

Mr. HOPE. And, I assume, you feel that they should be coordinated in every way, so there won't be unnecessary duplication in the work that might be done under the two different plans?

Dr. AHRENS. That is right.

Mr. HOPE. And, I wonder if you agree with me, in order to do that, there must be continuous study of the matter as the plans proceed under these programs?

Dr. AHRENS. As these plans progress and develop there will necessarily be changes from time to time—have to be.

Mr. HOPE. Mr. Poage, do you have any questions?

The CHAIRMAN. I do not understand the background you referred to as organization. I understood you to say it was your statement that the agricultural flood-prevention program was incorporated as part of the Pick-Sloan plan and already authorized; is that correct?

Dr. AHRENS. No, sir.

The CHAIRMAN. I misunderstood you.

Dr. AHRENS. It is my understanding, and I believe it is correct, that this Pick-Sloan plan was authorized and it is a plan worked out by various Federal agencies, of which the Department of Agriculture is one. However, the Department of Agriculture's programs are so tremendous, so big, they were not able to get this program in a form of a report before Congress. I think it was last year. Am I correct?

The CHAIRMAN. That is right.

Dr. AHRENS. And these hearings, as I understand it, are for the purpose of your reporting back to Congress for approval or rejection of this agricultural program. We are trying to impress on you that this detailed plan of the Department of Agriculture, while it has not

been able to come as quickly as these others, it is due to the tremendous scope. It covers that whole area on the map. It is grass land, wooded lands, farm lands, and all of it has required a great deal of time, study, and details.

Mr. HOPE. It was worked out and submitted some time after the Pick-Sloan plan itself had been approved by Congress.

Dr. AHRENS. That is right. The original authorization of the Pick-Sloan plan was authorized in generalities.

Mr. HOPE. Yes; in 1944. The Flood Control Act and plan was authorized, but the details of the plan was only recently submitted.

Dr. AHRENS. That is right.

Mr. HOPE. Thank you very much for your statement Dr. Ahrens.

The next witness on the list is Mr. Arno Windscheffel, attorney for the Kirwin Irrigation District of Smith Center, Kans. Mr. Windscheffel.

STATEMENT OF ARNO WINDSCHEFFEL, REPRESENTING KIRWIN IRRIGATION DISTRICT, SMITH CENTER, KANS.

Mr. WINDSCHEFFEL. Honorable Chairman and honorable Congressmen, it is with pride that I appear before you to give information concerning agriculture in the north central part of Kansas, and more particularly on soil conservation and flood control.

I was born and reared in Smith County, Kans., about 3 miles north of the North Fork of the Solomon River. I have seen it when it was so dry that there were but very few water holes, and I have seen it when it was a raging stream of water, carrying everything with it that tried to block its path.

Thirty years ago a rain of a few inches did not seriously affect the flow of the river, but today, due to silting and other causes, some natural and some man-made, the Solomon River is easily flooded and every rain of a few inches brings the river to flood stage. In the almost 40 years that I have watched the Solomon River, it has this summer carried more water than any year I can remember. The North Fork of the Solomon River was bankfull for weeks, and was at high flood stage three times in a period of 5 weeks.

To acquaint you with the North Fork and the South Fork of the Solomon River, might I remind you that both forks have their beginning a few miles southwest of this city of Colby; they both travel in an easterly direction and join near Cawker City, in Mitchell County, Kans., after having traveled about 150 miles as the crow flies. At Cawker City these two forks join to become the Solomon River, which flows into the Smoky Hill at Solomon, Kans. It was the city of Solomon that was continuously flooded for several weeks last summer.

The North Fork of the Solomon River has a drainage area of 2,770 square miles; the South Fork 2,225 square miles. The entire Solomon Basin has a drainage area of 6,860 square miles.

It has been proposed under the Pick-Sloan plan that flood-control dams be built to retain and retard the water from these rivers in order to control future floods. The dams proposed are Kirwin, Webster, and Glen Elder, which have been assigned to the Bureau of Reclamation.

The drainage area for the proposed Kirwin Dam is 1,373 square miles, for the Webster 1,125 square miles, and for the Glen Elder 5,015 square miles.

To give an idea of what these rivers contributed to the devastating flood of 1951, the following figures, quoted from Geological Survey Circular 151, prepared by the Water Resources Division of the Department of Interior, are given:

At 2 a. m. on July 13, 1951, the river gage height was 19.75 feet at Kirwin, Kans., on the North Fork of the Solomon River; the discharge was 13,700 cubic feet per second. The previous high was on September 18 in 1919. The river gage height at that time was 22.5 feet, and the discharge 24,000 cubic feet per second.

At Osborne, Kans., on the South Fork of the Solomon River, on July 13, 1951, at 2 a. m., the crest and the river gage height was 27.65 feet. The discharge was 76,800 cubic feet per second. The previous high was on August 29, 1950, when the gage height was 20.13 feet, with a discharge of 10,000 cubic feet per second. The 1951 reading was 7½ feet higher with slightly more than seven and one-half times as much water.

At Beloit, Kans., which is approximately 16 miles below the junction of the North and South Forks of the Solomon River, on July 13, 1951, at 4 a. m., the gage height was 39.3 feet, and the main discharge was 125,000 cubic feet per second.

An interesting fact is noted: Approximately 35,000 cubic feet per second of additional water was added by creeks between Kirwin, Osborne, and Beloit. It is also noted that the crest at Beloit was 2 hours later than the crest at Osborne.

The previous high at Beloit was on June 3, 1935. The gage height was 34.5 feet. The main discharge was 37,800 cubic feet per second. This was 4.8 feet lower than in 1951, when the river carried almost three and three-tenths times as much water.

Only a personal tour on these rivers can give one a true picture of the actual damage done by the 1951 flood. We have read and have been told of the damage and destruction to our cities, which were so horrible that we hate to recall the stories, but we have not been told of the wasteland along our once-fertile river valleys. Years of labor will be required to put this land back into cultivation, and some of it may be beyond reclaiming.

We of this section of the State feel that these rivers should be put to the use of man and not allowed to destroy that which man has attempted to build.

The proposed dams will make available water for irrigation. This section of the State has not always had too much water. Well does every older resident remember the drought years. Three times within my knowledge, my father, the late George Windscheffel, was forced to sell off his cattle and livestock because there was not sufficient feed to carry them through the drought. Irrigation can be an insurance against such a sacrifice.

Good soil practices, terracing, farm ponds, and better farming methods have all helped to bring back our soil. The building of flood-control dams are projects too large for the individual, and must be done, if done at all, by the Government. These dams should be built.

Mr. HOPE. Thank you very much Mr. Windscheffel.

The next witness is Mr. Fred Boydston of the Colorado Water Conservation Board. Mr. Boydston.

STATEMENT OF FRED BOYDSTON, COLORADO WATER CONSERVATION BOARD

Mr. BOYDSTON. Congressmen, others of the assembly, I don't have a prepared statement for the State of Colorado, but I would like the permission of the members present to submit a written statement at a later time, if we find it necessary.

Mr. HOPE. That is permissible and we will be glad to have you do so.

Mr. BOYDSTON. I just have a few notes I would like to explain. The Missouri Basin in Colorado represents 29 percent of the State. Three tributaries to the Missouri Basin originate in this area [points to map], the South Platte, North Platte, and the Arkansas Rivers. The rainfall varies—perhaps I should say the precipitation varies in the high-mountain areas of 60 inches down to 8 inches or even less in some of the Plains areas. In Colorado and the Missouri Basin their problems are varied. We have the high-mountain slopes which require reforestation of burned-over areas. Also, this beetle-infested area will have to be controlled somehow to prevent the erosion of the land.

The Forest Service has shown remarkable ingenuity in trying to eradicate the beetle and they are presently trying to figure out ways to reforest these areas that are so denuded.

Some solutions to our problems on the Plains areas can be solved by shelter-belt planting for wind-eroded areas, reseeding of range lands, and what they call "going-back land," that type of land which has been tilled at one time and allowed to go back to nature. Grazing control and runoff retardation. Many requests have been made of the Colorado Water Conservation Board, which I represent, to survey areas which are infected by floods, mainly in the Plains area. However, some are in the foothills and high mountainous areas. Quite often we have to tell the people in these areas that the Army engineers cannot be interested in their programs because it appears that there is a vast gap between the Army engineers' program and what the Department of Agriculture, through the PMA and Soil Conservation, can do.

So, since this Missouri Basin program has been put before the State and we have commented on it favorably, we have been trying to bring before the Plains people how their problems can be solved through the agricultural program. Without a doubt they seem to think that it is the solution to many of their problems, although they know that they will still have floods, but at least they hope to decrease the peaks of the floods which do the damage.

Many surveys, although not all in detail, have been made in these Plains areas. Some in the northern corner of the State along with the Nebraska people have been made. Others in the Pick-Sloan areas and others along the South Platte; others in the cities of Golden and Greeley, and others in the various Platte drainage area.

The snow melts in the mountainous areas and gives us water for the Plains areas, for their irrigation, and so forth. That water can be saved to a marked degree. I have heard various categories of

saving from 5 to 20 percent by reforestation and grazing controls. The water saved would indeed be helpful to those in the irrigated areas on the Plains.

The floods are devastating to the Plains areas due to the fact that they silt over many farm lands, some of them dry farms, some of them are irrigated. Sometimes that silt reaches a depth of 3 to 4 feet, completely putting out of usefulness hundreds of acres every year through the small tributary streams. I have seen various control structures made, erected through the cooperation of the landowners, Soil Conservation Service, and the PMA for the retardation of the runoff waters, reseeding of the grasses, some shelter-belt planting, contour furrows, and other structures. They have in general been successful, but due to the limited funds allotted to these various agencies, there just hasn't been enough of it done. It has to be multiplied 10 or a hundred times in order to do the job and protect the people from the high crests.

There is one critical area which we have named the Kiowa-Bijou Creek area, the tributaries to the South Platte. We have representatives from that area today who would like to present some of the salient features of the damage and what can be done to control this damage through the Department of Agriculture programs for the Missouri Basins.

Thank you gentlemen for having had this opportunity of appearing.

Mr. HOPE. Are there any questions?

Mr. HILL. Yes. I would like to ask one. Mr. Boydston, you spoke about wanting to show some pictures of runoff in a certain area. Do you intend to ask permission to do that at this time or at later date? Perhaps you could show them up at the hotel later this afternoon.

Mr. BOYDSTON. Yes; that will be satisfactory to us.

Mr. HOPE. Thank you very much for your statement.

The next witness is Mr. Dewey Carnahan, a rancher from Elbert County, Colo. Mr. Carnahan.

STATEMENT OF DEWEY CARNAHAN, CHAIRMAN, KIOWA CREEK FLOOD CONTROL COMMITTEE

Mr. CARNAHAN. Mr. Chairman, Congressmen, and fellow citizens, we have come quite a way from Colorado in order to be at this meeting, even though we understand that your meeting is primarily concerned with Kansas.

Mr. HOPE. No; this meeting is intended to include Colorado and we are very happy to have you here.

Mr. CARNAHAN. We surely appreciate this opportunity of meeting you gentlemen and having a chance to tell our story. I think perhaps Kansas is interested in our problems because we do send them a lot of silt and bad water and things like that.

The difficulty we have in our country is not one of cooperation, because our people cooperate very well with the Soil Conservation Service and the other agencies. However, we have a problem that individual people cannot reach and a problem which the Army engineers and Bureau of Reclamation people cannot reach. What we need we feel is flood-retardation dams which Congressman Paige ex-

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pressed very well: "To keep the thing from getting to be a flood." But there are structures that individuals cannot build and there are structures that the Army engineers and Bureau of Reclamation people cannot build. So, we feel we have a problem which nobody can reach and that is what we would like to talk about today.

Our farmers and our existing agencies are building stock ponds and spreader dams and using contours and other practices that individuals can use but, in addition to this because of the terrific cloudbursts, we need a larger agency, or at least the authority to empower some existing agency to build flood-control dams. The amount of silt that comes off the steep drainage is astounding.

(The brief submitted by Mr. Carnahan follows:)

Flood Problems and Conditions in the Kiowa Creek, West Bijou Creek, East Bijou Creek, Boxelder Creek, and Adjacent Creeks of Colorado

(Statement by Dewey Carnahan, chairman of Kiowa Creek Flood Control Committee, before Missouri Basin Inter-Agency Committee, Loveland, Colo., August 17, 1949)

TABULATED SKETCH OF FLOOD AREA (KIOWA, WEST AND EAST BIJOU CREEKS, AND BOXELDER CREEK)[1]

Principal: Kiowa Creek, West and East Bijou Creeks, Boxelder Creek.
Counties involved: Major portions of Adams, Arapahoe and Elbert Counties, plus limited sections of El Paso, Morgan, and Weld Counties.
Principal flood-damage area: Headwaters area, South of United States Highway No. 36.
Secondary flood damage area: Lowlands area, North of United States Highway No. 36 to South Platte River.
Total area in basin: 1,865,000 acres.
Farm area: 1,500,000 acres: Dry land farms—900,000 acres; irrigated farms—600,000 acres.
Estimated number of farms: 2,300.
Classification of lands: Dry and irrigated crop lands, and rangelands.
Estimated area population: 38,000.
Principal revenue sources: Livestock, hay, grains.

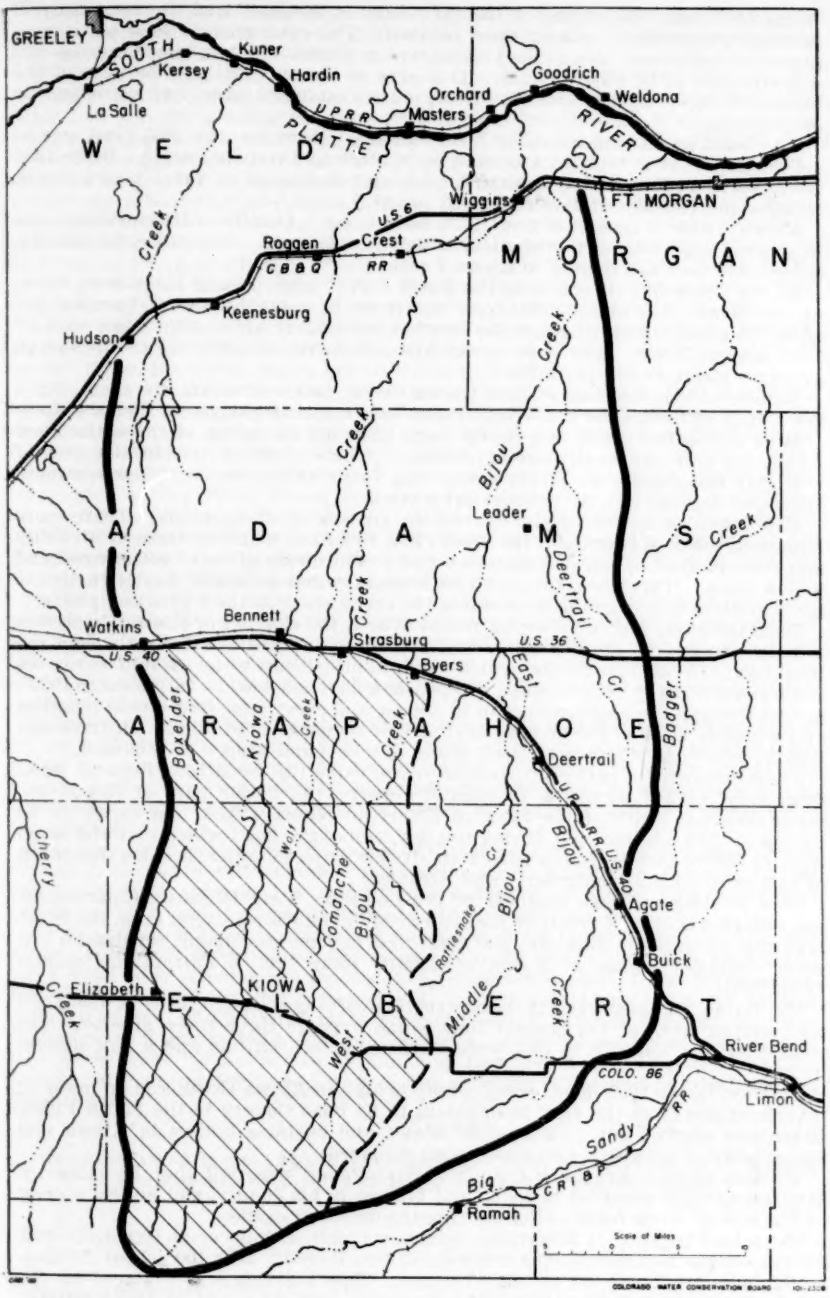
KIOWA CREEK FLOOD CONTROL COMMITTEE

Chairman: Dewey Carnahan, Kiowa.
Secretary: John McNey, Elbert county agent.
Committee (comprised of county commissioners, official representatives of agricultural planning committees, ranchers and farmers living on Kiowa and Bijou Creeks and adjacent territory):
Weld County: George L. Anderson, county commissioner; J. H. Cuykendall, farmer; Charles O. Plumb, farmer; George James, county agent.
Adams County: Del Cimyott, county commissioner; James Price, rancher-farmer; Carl Powell, county agent.
Morgan County: R. J. Lamborn, county commissioner; J. R. Christensen, county commissioner; Ernest Rosener, farmer-rancher.
Arapahoe County: William Giggal, county commissioner; W. L. Best, banker; F. B. Roop, farmer; George Lane, county agent.
Elbert County: Charles Kimsey, county commissioner; Walter Lambert, county commissioner; Dewey Carnahan, rancher; Robert Appleman, Soil Conservation Service.

STATEMENT ON FLOOD PROBLEM ON KIOWA CREEK AND ADJACENT STREAMS

The flood basin under consideration is in El Paso, Elbert, Arapahoe, Adams, Weld, and Morgan Counties, and embraces the drainage area of the Kiowa, West and East Bijou Creeks and the headwaters of Boxelder Creek. Total area involved is approximately 1,865,000 acres, of which nearly 1.5 million acres are

[1] Material assembled and prepared in collaboration with the Colorado Water Conservation Board, 212 State Office Building, Denver 2, Colo.


GREELEY
SOUTH PLATTE RIVER
Kuner
Kersey
Hardin
La Salle
Orchard
Masters
Goodrich
Weldona
UPRR
W E L D
Wiggins
FT. MORGAN
U.S. 6
Roggen
Crest
CBBQ RR
M O R G A N
Keenesburg
Hudson
Creek
Bijou Creek
Leader
A D A M S
Deertrail Creek
Watkins
Bennett
Strasburg
U.S. 40
U.S. 36
Byers
East Cr
Badger Cr
A R A P A H O E
Deertrail
Boxelder Creek
Kiowa Creeks
Cherry Creek
Weir Creek
Comanche Creek
Bijou Creek
Rattlesnake Cr
Bijou Creek
UPRR
U.S. 30
Agate
Buick
Elizabeth
KIOWA
E L B E R T
Middle Creek
West Bijou Creek
River Bend
COLO. 86
Limon
Sandy Creek
RR
Big Creek
CRIB
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Scale of Miles
COLORADO WATER CONSERVATION BOARD

farmed. Almost 40 percent of the farm land is irrigated and the remaining 60 percent is dependent entirely upon rainfall. The most critical flood territory—about 600,000 acres—lies at the headwaters in Elbert and Arapahoe Counties and a small part of El Paso County. This area is termed "critical" because of the unusually steep terrain and its history as a cloudburst area, and consequently deep erosion.

The basin has a long record of flood damage. However, the 1935 flood was so spectacular that it brought attention on a State and national scale. Since that time, smaller floods have been frequent and damaging to farm lands, roads, bridges and residential areas in small towns.

Kiowa Creek is typical of the entire flood basin. Details of its conditions are in general applicable to the whole area being considered. Therefore, for brevity, statements here are limited to Kiowa Creek.

Kiowa Creek has its origin in the Black Forest area, east of Monument, Colo., at an elevation of about 8,000 feet, and flows in a northeasterly direction for about 90 miles where it enters the South Platte River about nine miles west of Fort Morgan, Colo. The drop in elevation from the headwaters to the mouth averages about 40 feet per mile.

Numerous side drainages enter Kiowa Creek, many of which are short, but a few—such as Comanche and Wolf Creeks—are major drainages in themselves.

Most of the basin soil is a sandy loam with the exception of the bottomland which is a very fine black alluvial material. There is also a considerable area of rich clay soil classed as Elbert sandy clay loam which lies in rather scattered tableland sections and is excellent farm land.

The whole area was originally rich in grasses of many kinds. There were numerous small springs, and the creeks had live clear water in them at all times and were flanked by natural meadows and a continuous grove of cottonwood and willow trees. This was a favored buffalo country and naturally was attractive to early settlers who began homesteading the creek areas in the 1850's and 1860's.

Until the early 1920's following World War I, the channel of Kiowa Creek was narrow (from 6 to 12 feet wide) and meandered almost aimlessly through the meadows. Occasional floods, which were almost clear water, would cover the meadows with very little damage except when hay was down. In the early 1920's gullies through the meadows began to appear and every year they would lengthen and widen in spite of the strenuous efforts of trying to hold them with trees and rocks. Scouring of the creek itself began to widen and deepen the channel.

Then, following a series of drought years, came the disastrous flood of Memorial Day, 1935. According to reliable reports, the major part of this cloudburst occurred south of the town of Elbert on Kiowa Creek. In excess of 20 inches of rain and hail fell during the day, causing a flood which claimed seven lives in Elbert County and at least four lives in other counties, besides thousands of dollars of damage to property and livestock.

Paul S. Bailey, bridge engineer of the Colorado State Highway Commission, has reported that as a result of the 1935 flood in the Kiowa Creek area, the State highway commission replaced six destroyed bridges and made repairs on one other damaged bridge, at a cost of slightly more than a half-million dollars ($503,079).

Mr. Bailey has explained that construction costs quoted are those of 1935, and that similar work at the present time would average three times greater. The work that cost $503,079 in 1935 would approximate a million and a half dollars in 1949.

Further, in the 1935 flood, every county bridge on Kiowa Creek and on many of its tributaries from the very headwaters in El Paso County to the South Platte River was washed out. At least 30 homes and business houses in Kiowa and Elbert were swept away, and many more damaged.

William Giggal, Arapahoe County commissioner, reported that in excess of $150,000 damage occurred to roads and bridges in his county, and he had a crew of 100 men at work for 5 weeks burying the drowned cattle.

The school building at Elbert, almost a new building, was completely destroyed. Except for the fact that it was a Memorial Day holiday, over 100 school children might have been trapped in the structure. This building was replaced by the Works Project Administration, with some local help, at a cost of about $50,000.

Water and mud stood 6 feet deep in the Elbert County courthouse at Kiowa, ruining many vital records. The city of Fort Morgan with a population now of 4,880 was inundated, as was also the town of Wiggin.

The Colorado & Southern Railroad, which operated through Parker, Elizabeth, and Elbert, suffered such heavy losses that it suspended operations with a resultant loss of service and valuation to Elbert County.

Damage to the main lines of the Union Pacific and Burlington Railroads, loss of hay lands, farm buildings and livestock, and damage to other property in general were immense and difficult to estimate.

Kiowa Creek was estimated to have had a peak flow of 200,000 cubic feet per second in the 1935 flood, while in 1945 a flood with a peak flow of about 16,000 cubic feet per second—less than one-tenth of the peak flow of 1935—caused extensive damage again to highways, bridges, railroads, farms, and buildings.

A very good example of the amount of silt carried by the streams of this region is found at Bootleg Reservoir, an irrigation structure on Boxelder Creek near the northern boundary of Adams County. Since 1911, when storage first began, over 1,000 acre-feet of silt has accumulated in the reservoir. Where the outlet tube was originally 9 feet above the stream bed, silt now covers the tube to a depth of 8 feet—17 feet of silt that would have been carried on into the South Platte River were it not for this reservoir. The usefulness of this reservoir has been decreased by about 35 percent in approximately the same number of years.

As a result of the smaller 1945 flood, the United States Army Engineers constructed protective dikes at the towns of Elbert and Kiowa. The dikes serve to protect these two towns, but do not alleviate all flood damages.

If retardation structures and practices are applied to the critical areas, the benefits would be demonstrated not only in this particular flood basin, but also would assist in controlling sediment in the South Platte River from Fort Morgan to the confluence of the Missouri River. The life span of any large reservoir, such as may be located on the main stem of the South Platte River, into which waters of the Kiowa and other tributaries flow, would be lengthened by several years through the removal of silt before it could flow into the reservoir.

Direct benefits to the areas in this flood basin would be (*a*) protection of life and property, (*b*) stabilization of the general economy of the entire area, and (*c*) the promotion of future expansion of agriculture.

As to geology of this region, the area is underlain with a relatively impervious material which would retain the retarded water and serve to recharge many of the hidden underground channels. This would restore and stabilize the water table of the region and again permit subirrigation of many areas which are now arid. In addition, the use of pumped water for irrigation and domestic purposes could be redeveloped.

Scouring of the main channel of Kiowa Creek has forced the abandonment of all but 4 of 17 ditches in Elbert County alone. Although retardation procedures would not necessarily mean the rehabilitation of these and other abandoned ditches, such a program would at least preserve those ditches which are still in operation. Unless retardation is practiced, all water rights in the area are jeopardized.

It is the united hope of the residents of this flood area that this résumé of conditions in the basin will be sufficient to demonstrate and prove that retardation and conservation practiced in this locality would be of utmost importance and benefit to the Missouri River Basin and to the Nation as a whole.

As the Manitou Experimental Station of the Soils Conservation Service has made a study and report on an area adjacent to the region where the Kiowa and other flash-flood streams are located, the recommendations of the Manitou Experimental Station on soil conservation (except attached) could be applied with a minimum of additional planning and research, in order to begin construction of retardation and silt control structures. It is believed that a project of this description in the Kiowa, Bijou, and Boxelder Creek Basins should be designated for top priority as a part of any program authorized for the Missouri River Basin.

APPENDIX

Statements and Miscellaneous Data Descriptive of Flood Problem in Kiowa, West and East Bijou and Boxelder Creek Area, Colorado

Statement—Bijou Creek Flood of 1935

(By Ernest Rosener, Morgan County)

Bijou Creek enters Morgan County on the south from Adams County in T. 1 N., R. 60, thence flows in a northeasterly course for a distance of 36 miles, where it enters the South Platte River, then down the South Platte River in an eastern of 176,000 second feet. At this time Morgan County lost all its bridges with the loss of 4 lives.

During the 1935 flood the average width was 1½ miles wide with a peak flow of 176,000 second feet, at this time Morgan County lost all its bridges on Bijou

Creek and the South Platte River, consisting of 11 major bridges, with the loss of 4 lives.

The channel had widened in most cases to three time its original width. A grant of funds to rebuild these bridges was obtained from the Federal Government in the amount of $200,000 for material, matched by another $200,000 for PWA labor. In this rebuilding program there was built across Bijou Creek in T. 3 N., Rs. 58 and 59, the longest bridge in Colorado, being 2,050 feet long.

Likewise the State highway department lost their major bridge on Highway No. 6 and the Burlington Railroad Co. their bridge and the mile of grade. The cost of these replacements is not known and not included in Morgan County figures.

Damage to irrigation systems consisted of two flumes across Bijou Creek at replacement cost of $95,000 and two diversion dams across Platte River at a cost of $50,000.

There were approximately 37,000 acres affected in Morgan County by this flood, with an estimated loss of livestock, homes, and property in excess of $500,000 and reduced property valuation on this land for Morgan County to waste land at $0.50 per acre. Total losses during 1935 on Bijou Creek to Morgan County and its people would figure somewhere near 1½ million dollars. Floods occur down Bijou Creek at an average of perhaps six to eight per year with an estimated annual flow of from 8,000 to 10,000 acre-feet per year.

It is my belief that most of this water is unappreciated and unsuitable for irrigation because of the silt it carries. Most irrigation ditches on the South Platte River shut down their irrigation ditches when Bijou Creek floods. Percentage of silt runs from 30 percent up. No connection with Narrows Dam. Water would supplement well irrigation and could be used through old tile irrigation systems.

STATEMENT OF JAMES PRICE

BYERS, COLO., *August 8, 1949.*

To Whom It May Concern:

Why should water of the Kiowa and Bijous be controlled?

This article has to do with the Bijous which are similar to the Kiowa Creek. The informant has lived all his life on the Bijous and has watched the destruction for the past 50 years.

I have seen valuable hay meadows and pastures of thousands of acres ruined completely. I have known of hundreds of cattle and other livestock washed away. People's lives have been in jeopardy while their homes were washed away. Millions of dollars worth of railroad property, highway, and county bridges have been destroyed. Thousands of miles of fences have been washed downstream with from 40 to 60 percent sediment water flooding into the South Platte ruining irrigation water with sediment that is a detriment into even Nebraska.

These streams are sediment-laden and destructive because the soil is a sand and gravel and adobe formation, a type that washes easily due to the fall per mile. This fall is estimated all the way from 30 to 60 feet, leveling off to from 10 to 15 feet in the flatter country. A series of minor floods happen regularly, reaching different points downstream, all carrying a certain amount of erosion. Then along comes the daddy flood, sweeping it all with increased amount that it brings along. This rolling, boiling, large flood separates the gravel and sand from the adobe. The sand stops in the stream, making the treacherous quicksand, and later blows from the bed by the prevailing west and northwest winds which accounts for the sand dunes and hills that are on the east side of the streams. The adobe is settled in the flats on the west side to make the rich soil of the Antelope Flats. This land is being developed to pump irrigation. This large flat area has been subjected to big floods through the times which have built up the soil. These flats are roughly 5 to 6 miles wide and 50 miles long, some 275 square miles on 175,000 acres.

What can be done to stop this awful destruction of sediment-laden floodwater? I have the Owens Reservoir to cite as an example of the kind that would answer our problems if there were enough of them in different sizes.

The Owens Dam was put in some 60 years ago by the late C. S. Owens at the mouth of a large draw just before it empties into the Bijou. This reservoir takes care of any flood that happens in this draw. Then it has a feeder ditch that takes water out of the Bijou some 4 or 5 miles above for storage. Any sediment

is deposited in the bottom of the ditch and very little reaches the reservoir. This sediment is removed from time to time from the ditch. The sediment would not be so much on ditches above or closer to the source as the Owens project is downstream—just above Byers.

Elimination of the destruction would be most beneficial. Meadows and pastures mixed with trees would grow. Fishing and hunting would be good on these small reservoirs. Raising the water table downstream to the Platte River, thousands of acres could be irrigated by pump irrigation.

As to the legal aspects, old water rights—some 50 to 60 of them—would have to be wiped out and set up for this new development by private enterprise, or State, or Federal.

STATEMENT OF GEORGE L. JAMES, WELD COUNTY

The following is the information that is the best I can secure from several of the farmers and ranchers living along Kiowa and Comanche Creeks. As you probably know, the Bijou does not go through our county so I was not able to get any information on flood damage on that creek. I will try to put this information in as near a tabulated form as is possible to do.

The total crop area affected by floods and which was totally flooded in the 1935 flood is approximately 4,290 acres. This amount of cropland is usually flooded each year from 30 to 50 percent, depending upon the size of the flood. As far as these men can remember the 1935 flood is the only one which covered the entire crop area. In addition to this cropland, there is approximately 2,500 acres of very fine pasture which is also irrigated and most of this pasture is flooded each year. This pasture is capable, under normal circumstances, of carrying from 1 to 1½ animal units per month on a 6- to 7-month basis.

There are seven bridges in Weld County on the Kiowa and Comanche Creeks and in 1935 all the approaches were washed out, five of the bridges were gone and two very badly damaged. Under ordinary flood conditions the approaches to most of the bridges will be washed out but usually two or three bridges are all that go out or are badly damaged.

In regard to the crops grown on this 4,290 acres the following is a list of the crops with a percent of the area in the crop and the average anticipated yield in that area providing the area is not hit with flood:

Alfalfa, 25 percent, 4½ tons per acre; corn, 20 percent, 90 to 100 bushels or 17 to 19 tons of silage per acre; beans, 30 percent, 30 bushels per acre; barley and some small grains other than barley, 15 percent, 70 bushels per acre; sugar beets, 5 percent, 22 tons per acre; potatoes, 5 percent, 235 sacks per acre.

During the 1935 flood, the entire crop was lost with the exception of beans. It is estimated that the beans were reduced in yield approximately 55 percent. For ordinary floods, such as we have had in the last 10 years, the crop damage is from 50 to 60 percent.

I hope that this is the information you desire and if I can be of any further assistance in getting more information or in explaining this to you I will be very glad to be of assistance to you. I was not able to get any estimates on the amount of road damage due to the fact that none of the men knew exactly how much road went out with each of the floods or with the big one in 1935.

STATEMENT—FLOOD DAMAGE, KIOWA CREEK, 1935

(By Irving Jensen, Morgan County)

Damage to road bed and repair, cost. All county bridges in Morgan County, 8, cost.

One-half mile Chicago, Burlington & Quincy Railroad grade and track, cost. About 20 sections land under water, cost.

Two irrigation wells in 1935, or about 200 acres.

Seventy irrigation wells in 1949, or about 8,000 acres.

Damage to fences and telephone lines.

It moved at least 15 houses off foundations in Wiggins and 2 houses one-half mile.

No lives lost.

WATERSHED MANAGEMENT, MANITOU EXPERIMENTAL FOREST

Research results obtained by the Rocky Mountain Forest and Range Experiment Station at its Manitou Experimental Forest offer some clues to the solution of flood problems. The Manitou Experimental Forest is located west of the Rampart Range on Trout Creek. This is a typical area of the front range in the ponderosa-pine zone. Since the vegetative type, soils, and topography are almost identical to those of the Black Forest, the research results at this station should apply equally well to the area in question.

The following data are taken from the 1948 annual report of the Rocky Mountain Forest and Range Experiment Station:

"Permanent bunchgrass plots show increased runoff and erosion as a result of cattle grazing

"Since 1938 runoff and erosion have been measured from a series of six permanently established plots in the bunchgrass type at Manitou Experimental Forest. Each plot is one one-hundredth acre in area and equipped with catchment tanks to provide a measure of runoff and soil movement produced by natural precipitation.

"In August 1941 treatment was applied by hand clipping to simulate grazing, but in succeeding years cattle were used and were controlled with an electric fence. Each year two plots have been grazed heavily, two moderately, and two have been left untouched. Since treatment began there have been a total of 59 storms during late spring, summer, and early fall months, causing measurable runoff, and 10 storms sufficient to produce erosion." (See table 2.)

TABLE 2.—*Runoff and erosion from bunchgrass plots since grazing treatment began in 1941*

A. RUNOFF IN INCHES, DEPTH

Year	Number of storms	Grazing intensity		
		Heavy	Moderate	None
1941	3	0.02	0.02	0.01
1942	3	.04	.03	.03
1943	6	.16	.16	.12
1944	7	.66	.43	.25
1945	13	1.96	1.05	.83
1946	4	.11	.09	.01
1947	14	.53	.25	.08
1948	9	.19	.17	.06
Total	59	3.67	2.20	1.39

B. EROSION IN POUNDS PER ACRE

1943	1	204	117	67
1944	4	659	402	392
1945	5	447	183	206
Total	10	1,310	702	665

"It appears evident that heavy grazing causes both increased runoff and erosion whereas moderate grazing results in an intermediate increase in runoff and only negligible changes in soil movement. A large part of the soil movement came as a result of storms with a total of 0.60 inches or more precipitation. In the last 3 years few storms of that magnitude were experienced, with the result that there was no measurable erosion from any of the six plots.

* * * * * * *

"Storm analyses indicate the relation of soil moisture to floods

"A study of storm patterns from records of the Missouri Gulch drainage has given some clue to the combination of events which lead to disastrous floods in the Front Range. For instance, some of the events which led to the flood of May 10, 1947, which centered in Monument and Fountain Creeks can be traced by a study of records from Missouri Gulch. While it is true that the center of the storm was on the east side of Rampart Range, enough precipitation was received on the west side to tell the story.

"In contrast to many storms experienced in Missouri Gulch the one in question resulted from a moderate quantity of precipitation at relatively low intensity over the entire watershed. Records show a total of 1.31 inches received with a maximum intensity of a total of 0.51 inches per hour. The flow recorded at the stream gage was one of the highest on record. The ground-water charts showed that the water table was relatively high, an indication of saturated soils. Only a small amount of soil storage was available to receive the storm, with the result that excessive amounts of water entered the streams by surface and subsurface flow. In contrast to the 10 to 15 percent annual water yield characteristic of Missouri Gulch, approximately 45 percent of the total precipitation from this storm reached the stream channel within a few hours. It seems probable that saturated soil conditions in May and early June contribute to floods during that period in the Front Range."

* * * * * * *

Conclusion from above report

In view of the foregoing it seems obvious that vegetative cover in itself is not sufficient to control all of the anticipated runoff. Structures such as check dams, contour furrows, etc., in combination with a good vegetative cover are practices which the individual farmer or rancher can do. In addition the construction of intermediate structures which are too small for the Bureau of Reclamation or Corps of Engineers, and too large for individual farmers are of extreme importance.

Mr. HOPE. Are there any questions on the part of the members of the committee?

The CHAIRMAN. I think I would like to ask one. I understand that you are asking for exactly the kind of program that the Department of Agriculture is seeking to develop in the various watersheds where this work has been authorized—this flood-prevention work.

Mr. CARNAHAN. That certainly has been our idea and I am happy to know that the Department is thinking about the same thing.

The CHAIRMAN. The Department began in 1939. It was authorized by the Flood Control Act of 1936 or 1937. It was authorized back some 15 years ago. The Department has carried on surveys and has submitted a number of these reports to Congress on a number of these relatively smaller watersheds, and I believe there are 11 authorized over the entire United States. The program has gone very slowly. I have felt that we should speed up the work of this kind because there is certainly a gap between the field that is now covered, in which the Army engineers and Bureau of Reclamation are both interested, primarily of the larger structures that would store a substantial amount of water. They can't reach down to the point to which the farmer can reach up, because the individual farmer cannot be expected financially to carry on the work that is necessary to retard the waters, even in a good-sized creek.

He can put into his own lands those practices that improve the value and productivity of his own soil, and incidentally, of course, gives substantial benefits to the whole community; because I don't think any farmer can strip-farm, can put more stock ponds in, can summerfallow, all for his own benefit, without helping the entire community.

Obviously, when he makes more water sink into his own farm, there is less water coming down the main streams. However, there is a point beyond which he cannot go, and to which the Army engineers and the Bureau of Reclamation will not reach down; they consider it too trivial. And that is what we are interested in.

Mr. HILL. Mr. Carnahan, you are from my district and almost from the same point where we were asking questions of the others here. Did you hear the testimony of Dr. Ahrens?

Mr. CARNAHAN. Yes; I did.

Mr. HILL. He will never get relief until you get relief up where the trouble begins.

Mr. CARNAHAN. I don't think it is any quarrel between the Army engineers and the Bureau of Reclamation. They have both striven to help us. However, I believe eventually, in order to make the dams live up to expectation, you have to do some work above them which will protect the area below as well as above. The cost of building these small dams is not going to be so nearly as great as the larger dams. I think the smaller structures will keep the water as near the top as you can.

Mr. HILL. And you are at the top of the drainage system of the Platte River?

Mr. CARNAHAN. That is right.

Mr. HOPE. Are there any further questions? Since there are none, we thank you very much for your statement, Mr. Carnahan.

I think we possibly have time for one more witness before we adjourn for lunch. I will call Dr. E. C. Harrah, of the State Association of Soil Conservation Districts, Greeley, Colo.

Dr. Harrah.

STATEMENT OF DR. E. C. HARRAH, GREELEY, COLO.

Dr. HARRAH. Honorable chairman, the honorable Congressmen, and ladies and gentlemen, I am not speaking for the soil conservation districts of Colorado. They have not authorized me to do so. I am merely speaking as an American citizen and as one who is interested in the welfare of my children, my grandchildren, and their children's children. I think that is the problem we face today.

You need only to look at it from the basis of the fact that all our living comes from the soil. It is the soil and water that provides what we eat, our shelter, and what we wear. And, unless we begin pretty soon on the rehabilitation of the soil, not only in the Missouri Valley but all over the United States, we are going to find ourselves very much in the same difficulty of many Europeans and Asiatics of today, who have not kept their soil, and today have famines with regularity.

I approve very much of the agricultural program in the Missouri River Basin, because it is an intelligent program that will lead us to better conditions all over the country. I should say I am not opposed to the Pick-Sloan plan. These two plans, as I see it, should be coordinated because they do complement each other. We need to hold onto the water up in the headwaters by providing and caring for the watersheds; also, by building dams to slow down the rundown to the rivers. But that alone will not do the job. We need also to treat the soil to prevent the runoff from being so rapid and hold it on the land as long as we can. Let it percolate into the soil and run out into the rivers down below at a slower rate. That will not only help the folks at the top of the watershed but it will help those below. It is not the ordinary run of water that causes trouble; it is the excessive run that causes the damage. And, if we can regulate those runoffs, we will have practically solved most of our problems. However, we cannot prevent floods nor can we always control them, because we have always had them. However, we can minimize the effect of these floods

by controlling the runoff waters in the watersheds and by building better dams and by holding the water in the dams long enough so that the rivers below can carry the water.

Until we treat the land and prevent siltation, we will have a continuous building up of the river beds below, flooding of the lands outside producing marshes and swamps, and floods worse than we know now or have known in the past years; because as the siltation goes down, it fills up the bed of the rivers and spreads the waters over a wider region.

I should also like to add this note. If our ancestors had had the knowledge of the people of today in treating the soil, as they moved gradually West, we need not come into the situation we now have. And I should like to emphasize the educational phase of the program, partly because I have taught school all my life and partly because I have taught conservation of natural resources for the last 15 years to prospective teachers. And, until we educate not only the people on the farms but the people in the cities and those children who are in the schools today who will eventually come into control of the soil, we have not solved our problems. I would like to emphasize the educational phases of the agricultural program and suggest that the educational phases be coordinated so that the information that goes out will not be one thing at one place and something else at another. That is what causes dissension and confusion and misunderstanding all over the country, as well as in Congress. If we can coordinate the educational program it ought to be done first.

In one sense it is bad or regrettable that this program started ahead of the Pick-Sloan plan. That is what will save the Pick-Sloan plan from falling into failure in a few years. I should like to add my bit as a citizen of the United States for the approval of the Missouri River program.

Mr. HOPE. Are there any questions from the committee? Thank you very much, Doctor, for your statement.

The committee has about 5 minutes before it is necessary for us to adjourn for lunch. I believe we will have time for one more witness and at this time will call Mr. Joe Penfold, western representative, Izaak Walton League.

STATEMENT OF J. W. PENFOLD, IZAAK WALTON LEAGUE OF AMERICA

Mr. PENFOLD. Mr. Chairman and members of the committee, the Izaak Walton League of America is a broad-gage membership organization, with hundreds of local chapters and tens of thousands of members all over the Nation. Our slogan is "Defender of soils, woods, waters, and wildlife." Perhaps it is significant that we mention wildlife last, as we have come to learn that wildlife is a product of the land in exactly the same sense as a crop of corn or wheat. Wildlife and fish, like humans, can exist only when we do a good job of managing the basic resources of soil, vegetative cover, and water.

In recent years there appears to have been a growing tendency in public thinking—that river basin development—that is, the construction of great dams, reservoirs, hydroelectric power plants, etc.—is the answer to all the complex problems of the West. The agricultural program for the Missouri Basin, as an appropriate example, comes

along years after the Pick-Sloan construction program is well under way. The appearance would be that land management is supplementary to the program of river-basin construction.

Land management may not be spectacular. There are no broad expanses of concrete, no place for bronze tablets, no dedication ceremonies with the pushing of a button to set wheels in motion. But—it is our opinion that land management is the fundamental program, the basis of life and prosperity, and construction developments are at best supplementary to it and wholly dependent on it.

In other words, the organization I represent believes that land management, in its broadest concept, is fundamental, and must be the basis of any program for the development of the Missouri Basin or any other river basin.

We believe that the well integrated and truly comprehensive river-basin program must begin where the raindrop or flake of snow falls—at the very ridgepole of the watershed. It is there that water begins to serve its beneficial purposes for man or where it begins its destruction of values which man and the Nation require.

We have heard the figures that over 50 percent of the Missouri's flow past Sioux City originates on less than 10 percent of the land—the forest lands of the Rocky Mountains. These figures illustrate very well that the uppermost watersheds of the Missouri should have the highest priority for attention. Failure to give that priority can only result in perpetuating the gravest kind of risk to every dollar spent in river basin work downstream.

Let me give one little example that can be repeated in hundreds of other locations.

The city of Denver is now engaged in the construction of a $12,000,000 dam in South Boulder Creek, to supplement its municipal water supply. Recently I made a trip into the watershed above the dam site and saw beaver dams, some 12 to 15 feet high, built during the last 4 years, already silted full. Inescapable evidence that soil is being lost from the slopes above at an accelerated rate. The point of the illustration is that Denver is spending a big sum of money to construct a dam and reservoir, but is doing nothing to protect its investment. We are overly optimistic if we count entirely on the beaver to prevent eventual loss of the dam's usefulness.

Silt and erosion debris, in a reservoir, in an irrigation ditch in a municipal waterworks, or packed in the rooms of a dwelling or factory as floodwaters recede, is a very real out-of-pocket expense, which I doubt we can afford. It increases our costs of using water beneficially, it reduces our capacity to irrigate lands, generate power, operate industry, etc. It reduces or eliminates the production of fish and wildlife.

More important than any of these losses of value or increases in costs, silt in a reservoir, is soil—the productive capacity of which we have forever lost.

In the public-land States of the West, about 50 percent of all land is federally owned—that is, it is owned by the people—and administered by the Forest Service, Bureau of Land Management, Indian Service, Soil Conservation Service, etc.

The responsibility for sound management of these public lands—vital watersheds in most instances—in the final analysis rests with the

people themselves. We have not discharged that responsibility very well. We had better get on the ball and do so.

To do that will cost money—probably a lot of it. But there is no place we can make a better investment—an investment that will pay increasing dividends throughout all the years of the future. Where improvement of these public-land watersheds can be achieved through reseeding, reforestation, eradication of forest pests—or where deterioration of land has gone so far that more drastic and costly measures must be taken—we must be prepared to do so.

But along with such measures, that will require expenditure of public funds, there are other things that must be done. Maybe they are negative in a sense.

We can sum them up by saying we must stop existing abuses that are destroying our watersheds or preventing them from fulfilling their great ultimate purposes. We should know enough now, and have the courage to eliminate the problems of overgrazing, destructive logging practices, mining methods, and other watershed damaging activities. The time has long since passed for temporizing with these costly abuses we know must be controlled.

In emphasizing problems of public lands it is not my intention to minimize what must be done on private and other lands. I do have great confidence in the ability of landowners, through their soil-conservation districts and with needed help and cooperation, to get that job done. It will take the interest and assistance of all of us—and certainly that of Congress itself.

Recently, I was in that watershed. I found beaver dams 12 to 15 feet high built within the last 4 years. From the silt there is conclusive evidence that there has been a tremendous loss of soil off those slopes. The point of the story is that we are going ahead and building dams but doing nothing about the land above the reservoirs. If we thought about it at all, it appears we are putting too much confidence in the beavers. [Laughter.]

In emphasizing the problems of public land, I don't mean to minimize the problems existing on all other lands. I do have great faith in the American people, with appropriations through the Soil Conservation Service and other agencies, to do a bang-up job of watershed management on private lands, but it is going to take cooperation of everybody concerned, and certainly the help of Congress.

I thank you very much.

Mr. HOPE. Are there any questions? Thank you very much Mr. Penfold.

We will adjourn for lunch at this time. The hearing will resume at 1:30 o'clock this afternoon.

AFTERNOON SESSION

Mr. HOPE. The meeting will please come to order. The next witness is Mr. H. W. Clutter, of Holcomb, Kans., representing the National Association of Wheat Growers. Will you please come forward, Mr. Clutter:

STATEMENT OF H. W. CLUTTER, REPRESENTING THE NATIONAL ASSOCIATION OF WHEAT GROWERS

Mr. CLUTTER. Mr. Chairman, members of the committee, I have somewhat of a prepared statement which I believe I'll read rather than state it verbally.

My name is H. W. Clutter, a farmer of Holcomb, Kans., and I am president of the National Association of Wheat Growers.

I have farmed in the vicinity of Finney, Kans., for the last 14 years and have lived in that area all my life. The broad program of the National Association of Wheat Growers very fully covers soil-conservation and flood-control problems insofar as the area we are concerned here today. The national association, in the broad sense, advocates the use of every method possible to control water, to retain and hold water on the land where it falls. Our committee has made studies concerning keeping the land covered with suitable crops and thus helping to retain the water where it falls. The association has always recognized the desirability of contours and mulch practices in helping to keep the water where it falls. Once this problem has been licked we will next be concerned with lessening damage further down the stream.

I personally own land along the Arkansas River and often it has overflowed upon the bottom land, destroying wheat, grass crops, and fences. Undobutedly there will be floods at certain times on most of the important rivers, but it seems to me we certainly should not neglect working out the problem where it originates clear on to the end where it pours into the ocean. I believe this will complete my formal statement.

Mr. HOPE. Any questions from the members of the committee? Thank you very much, Mr. Clutter.

At this time the committee will hear from Mr. Strunk, president of the Republican Valley Conservation Association of McCook, Nebr. Mr. Strunk.

STATEMENT OF HARRY STRUNK, PRESIDENT, REPUBLICAN VALLEY CONSERVATION ASSOCIATION

Mr. STRUNK. Mr. Chairman and members of the committee, I have been thinking that I have enjoyed this meeting very much today, but there has been one thought I have had, and that is, while talking about the conservation of our natural resources, we should also think about the conservation of time. So, I am going to make my report brief, I hope.

It may seem rather strange that this hearing on the part of the subcommittee of Congress investigating runoff waters of western Kansas, eastern Colorado, and southwestern Nebraska should be held at a point where the subject is probably the least important as it applies to the floods which swept the Republican and Missouri River drainage basins through their growing season, affecting vitally the Kansas Citys and other metropolitan areas of Kansas and Missouri. If you remember, the great devastation came from the headwaters of the Kaw, Saline, Solomon, Republican, and others, and all the tributaries, which if you remember created one of the worst floods in the history of our country.

In 1935, 112 lives were lost on the Republican River within a distance of 120 miles. This recent flood was a repetition, only on a larger scale, where a heavy loss was suffered at the mouths of the rivers rather than at the headwaters. Here again comes difference of opinion as to whether these waters should be controlled at their source or at their mouth.

The history of this past year with the tremendous loss suffered in the lower Missouri River drainage basin is sufficient evidence that the policies of the Bureau of Reclamation and the Army engineers in controling these waters at their sources, involving the work of Soil Conservation, Department of Agriculture, Fish and Wildlife, are not enough. Had it not been for the work and development which had been taking place on the upper regions of the rivers and tributaries, the loss would have been multiplied many times.

I quote a statement made by the district manager of the Kansas River district of the Bureau of Reclamation, Mr. H. R. Robinson, who said:

> When our proposed plan has been completed, which plan will be dams on the Smoky, the Saline, the three dams on the Solomon, the Pioneer, on Rock Creek, on Red Willow Creek, on the Republican and all their tributaries, there will be no more repetition of the recent 1951 floods.

And that is "dam" for sure. [Laughter.]

From where we sit today in this investigation, I wish to call your attention to the fact that the closest waters which flow through the northwestern Kansas communities are the headwaters of the Prairie Dog, some 15 miles east of Colby, Kans.; the headwaters of the Solomon, southwest some 10 miles, while the waters of the Saline originate a few miles south of Brewster, Kans. This is where the devastation starts, which multiplies as it increases with hundreds of thousands of tributaries on to the conflux of those rivers and tributaries which go into the Missouri and Mississippi.

There has been a theory in the past that the floodwaters of this country should be controlled and conserved for the benefits of the lower drainage areas, including the Kansas Citys, Topeka, Salina, and the rest of the great cities of Kansas and Missouri; that the lives and property of the people living above were not worth consideration.

Let me call your attention to the fact that the Army engineers and Bureau of Reclamation made a survey after the Harlan County Dam was approved by Congress in 1938, with 98 percent of all the benefits to the Kansas Citys, sacrificing everybody who lived above the Harlan County Dam and the other dams which were proposed to save the Kansas Citys and the lower Missouri River drainage basin.

You men are here making this survey and inspection; you have a grave responsibility; you have a responsibility not only to the people of the lower drainage basin but to those living above it. For seven times this year our people have been flooded. We hope that you will take this back to Congress as a statement made by an organization which represents three States—southwestern Nebraska, northwestern Kansas, and eastern Colorado—reaching into three States where the waters originate and where, as many have said this morning, piles it on down to the lower regions of the rivers.

I wish, Mr. Chairman, to have this statement incorporated into the record as signed by the Republican Valley Conservation Association, and myself as president.

Mr. HOPE. We will be glad to have it incorporated into the files of this hearing. Are there any questions? We thank you very much, Mr. Strunk, for your statement and for your appearance.

Mr. STRUNK. I have another witness to present: Mr. Parker, of Danbury. I would like to have him present some evidence as to what happened on the Beaver Creek this year for the record.

Mr. HOPE. We will be glad to hear from Mr. Parker at this time.

Mr. PARKER. Mr. Chairman, members of this committee, and Mr. Strunk.

I am a farmer living on the Beaver Valley at Danbury, Nebr., a very short distance below the proposed Nelson-Buck unit on the Beaver Creek. I believe this Beaver Creek originates in Colorado, empties into the Republican about 140 miles away. We are of rural nature there. We do not have large towns; and, yet, we are hurt just as bad as where there are larger communities who can yell louder than we can.

As I say, I am a farmer there, and I might also add that I do not farm for a hobby; I make a living out of it. I raise grasses, try to plant other grasses to prevent the erosion of the hills, which all of us are continuing and are finding the importance of terraces and farm ponds. It shows up every place, but that isn't enough. We have had seven floods this years, as Mr. Strunk has pointed out. All of them originated in the State of Kansas. The rains have been wonderful where we live. There was no excessive moisture or rainfall, but out of these seven floods from June 10 to approximately the 5th of September we have lost topsoil that will take years to replace.

I might add that in 1935, after that flood, I took 1 acre and from that one particular acre, which raised corn approximately 18 inches high, concentrated on that acre the next 5 years adding fertilizer, straw, and humus—everything I could get to put on it. At the end of 5 years I was up to 20 bushels on that acre. I have used this illustration to show you the tremendous loss of topsoil and what fertility can do if a person applies fertilizers and so forth.

I have here in my hand a partial survey made from Cedar Bluffs, Kans., to Wilsonville, Nebr.—40 farms, each one signed and with each farmer taking his time and trying to get a correct estimate of the damage that was done upon the valley alone in his particular section. This amounts to for 3 years—the past 3 years for 40 farms—$502,392. That is approximately just 12 continuous miles of farms. We asked each farmer, when making out this estimate, to be conservative, to figure loss of crops and, as nearly as he could, the loss of soil. This would run approximately $45,000 to the mile; and, when you have a hundred miles, it amounts to a tremendous figure just on the local valley alone.

I would like to file these statements with this committee.

Mr. HOPE. Without objection, the witness may file the statements with the committee, and they will be made a part of the record.

(The statements referred to above are as follow:)

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 1, township 1, range 26, located on the Beaver Valley in the county of Red Willow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil, and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$12,740
1950	13,720
1951	14,700
Total	41,160
Soil loss total estimated for 3 years	1,000
Improvement loss, such as fences, bridges, buildings: Total, 3 years	900

While flooding is bad almost every year, this has been the worst. Even my cattle were isolated for weeks.

We can handle the local flash floods if the long continued floods that come out of Kansas are controlled.

Respectfully submitted this 18th day of October, 1951.

HERBERT LEOPOLD.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in sections 27, 32, 34, township 2, range 25, located on the Beaver Valley in the county of Furnas, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	----
1950–51	15,750
Total	29,400
Soil loss total estimated for 3 years	13,500
Improvement loss such as fences, buildings: Total, 3 years	1,250

I now have 2 creeks running through my place. The soil loss was terrific. I only wish I could show you personally this damage.

Respectfully submitted this 18th day of October 1951.

CLARENCE TREAT.
A. THERON TREAT.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION,
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 19, township 1, range 27, located on the Beaver Valley in the county of Red Willow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$1,500
1950	500
1951	8,000
Total	10,000
Soil loss total estimated for 3 years	2,500
Improvement loss such as fences, bridges, buildings: Total, 3 years	500

Nineteen hundred and twenty-three brought the first flood of the Beaver Valley upon us from the watershed of northwest Kansas. Floods since that time have occurred with almost annual regularity. Consequently it is not only impractical but impossible to keep a stand of alfalfa on the low ground. The rotation of alfalfa and corn is necessary to maintain high productivity. Under the existing conditions the use of commercial fertilizer is almost imperative to guarantee good crop yields yet this expensive method is hardly justifiable due to the likelihood of flood; consequently much of the fertile bottom ground has been lost to farming and is being put to various types of pastures. This year we had 11 floods of disastrous nature, not one of which was local. The proposed up-creek reservoir could easily triple our present corn and alfalfa yelds.

Respectfully submitted this 18th day of October 1951.

S. C. GREEN.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in sections 10, 15, township 1, range 26, located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$800
1950	2,000
1951	3,200
Total	6,000
Soil loss total estimated for 3 years	1,200
Improvement loss such as fences, bridges, buildings; total, 3 years	225

Continuous flooding the past 5 years has resulted in serious damages to land along Beaver Creek. On this farm unit, in 1951 bottom land overflowed on four separate occasions. Six days of prolonged flooding the first week of September 1951 depleted topsoil, cut ditches, and channels in once highly productive fields. Fifty-five acres of crops were lost on this farm. Such losses will continue until some control measures are made. In this matter we turn to you, with high hope, to consider the flooding problems of Beaver Creek.

Respectfully submitted this 4th day of October 1951.

L. M. WELBORN.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 11, township 1, range 27, located on the Beaver Valley in the county of Red Willow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$2,000
1950	1,000
1951	4,000
Total	7,000
Soil loss total estimated for 3 years	1,000

The buildings on this farm are high enough that the high waters do not affect them. Most of the fences on the bottom land were destroyed in 1944 and have not been replaced.

Respectfully submitted this 12th day of October 1951.

SAM WALTERS.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 27, township 1, range 28, located on the Beaver Valley in the county of Red Willow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$1,680
1950	1,680
1951	12,525
Total	15,785
Soil loss total estimated for 3 years	5,000
Improvement loss such as fences, bridges, buildings: Total 3 years	1,000
Total	21,785

Valley losing fertility and humus due to continuous flooding. Impossible to rotate crops.

We think valley would support three times as many people if flooding controlled.

Respectfully submitted this 11th day of October 1951.

A. C. PEW.
LOWELL PEW.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 2, township 1, range 26, located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$715
1950	2,695
1951	5,362
Total	8,772
Soil loss total estimated for 3 years	2,000
Improvement loss such as fences, bridges, buildings, total, 3 years	1,500

Every year the water gets worse, mostly coming from northwest Kansas.

Respectfully submitted this 18th day of October 1951.

ROBERT H. DOFFER.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 10, township 1, range 27, located on the Beaver Valley, in the county of Redwillow, State of Nebraska.

These floods have occurred for many years, but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$1,500
1950	1,200
1951	9,750
Total	12,450
Soil loss total estimated for years	3,000
Improvement loss such as fences, bridges, buildings: Total, 3 years	1,650
Total loss	17,100

Water has been around buildings, silos caved in, wells ruined, and fences and bridges washed out prior to these 3 years.

The potential loss, as compared with the past production in crop and livestock, can hardly be estimated. Prior to 15 years ago nearly every farm raised from 100 to 1,000 head of hogs every year. Now there is practically none. This is just one example.

I believe with flood control this valley could support three times as many people better than the ones that are here now.

Respectfully submitted this 15th day of October 1951.

R. A. PARKER.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$4,000
1950	3,000
1951	6,400
Total	13,400

Soil loss total estimated for 3 years	3,000
Improvement loss such as fences, bridges, buildings: Total 3 years	1,000

The water from the Beaver Creek floods around all our farm buildings gets in our wells, and cesspools. We have to move out on an average of once a year and twice in the year of 1951. These floods are making it an unfit place to live, although it is a well-improved farm.

Respectfuly submitted this 15th day of October 1951.

LEONARD TOWNLEY.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The 300-acre farm owned by me is located in section 8, township 1, range 27, located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution wil be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$2,000
1950	3,000
1951	4,000
Total	9,000
Soil loss total estimated for 3 years	5,000
Improvement loss such as fences, bridges, buildings: Total, 3 years	1,500
Total loss	15,500

Our Beaver Valley is known for many miles for its rich and productive soil. Floods caused by no control of excess water is at a stage where some action must be taken soon. On the above farm new channels are cutting through, creek banks are caving in, trees fall into the creek, crops are flooded under at a great loss. This spring the creek bank caved off so near a 32-foot building it had to be moved at a large expense. I believe that a dollar spent now would come back 100 times.

Respectfully submitted this 5th day of October 1951.

V. H. LORD.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm operated by me is located in section E½31, township 1, range 28, located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years, but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$1,500
1950	2,000
1951	10,000
Total	13,500
Soil loss total estimated for 3 years	5,000
Improvement loss such as fences, bridges, buildings: Total, 3 years	100

There is 120 acres the water runs over on this place; when it floods there is 20 acres, the best soil is all washed away, and every time it floods there is some soil goes off the rest of it, and if there isn't something done it won't be long and the soil will all be gone.

Respectfully submitted this 4th day of October 1951.

SAM LEIBRANDO.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm owned by me is located in section 24, township 1, range 28, located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$1,500
1950	2,215
1951	4,500
Total	8,215
Soil loss total estimated for 3 years land depreciation	10,000
Improvement loss such as fences, bridges, buildings: Total, 3 years	1,200

Due to the frequent flooding where my farm is located, I am convinced that to continue cultivating it would be unwise. I had intended to seed the remaining land to grass, but due to the extent of damage to the grass this year, I have about given up this idea, unless we can have some form of flood control.

Respectfully submitted this 8th day of October 1951.

LLOYD DARLING.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section SE. 18, township 1 N., range 27 W., located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years, but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$ 250
1950	500
1951	600
Total	1,350
Soil loss total estimated for 3 years	Very large
Improvement loss such as fences, bridges, buildings: Total 3 years	$550

Since purchasing this 6 acres of land we have had to move every time it rained three or more inches in a short time. This year it is impossible to move back due to the facts that our drinking water is ruined, the house is settling until the plastering is getting big cracks in it, the doors won't close tightly and it is too wet for the children to be outdoors. The danger of disease is very great. Every time there's even a little high water, our place is isolated, unless one is able to swim or wade.

Respectfully submitted this 15th day of October 1950.

MR. AND MRS GERALD RUBY.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 32, township 1, range 28, located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years, but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$300
1950	500
1951	6,500
Total	7,300
Soil loss total estimated for 3 years	2,000
Improvement loss such as fences, bridges, buildings: Total, 3 years	300
Total loss	9,600

Too hard to estimate the loss to the farms in the valley but to the soil it has been an enormous loss to we farmers. It will take much work and expense to build this back to where it would keep as many families as was 15 to 20 years ago. Let's have flood control.

Respectfully submitted this 18th day of October 1951.

CLYDE WEYENETH.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 24, township 1, range 28, located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years, but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$4,000
1950	3,500
1951	13,000
Total	20,500
Soil loss total estimated for 3 years, washed channels in fills	2,000
Improvement loss such as fences, bridges, buildings: Total, 3 years	1,500
Total loss	24,000

You will note from this total loss that we in the Beaver Valley need some attention. It's a shame to see this good fertile valley going to ruin. We need help now.

Respectfully submitted this 11th day of October 1951.

GALLATIN BROS.
J. E. GALLATIN.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 17, township 1, range 27, located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years, but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:

1949	$4,000
1950	4,000
1951	9,000
Total	17,000
Soil loss total estimated for 3 years	2,000
Improvement loss such as fences, bridges, buildings: Total, 3 years	1,000
Total loss	20,000

This is one of the best farms on the Beaver Valley but it is losing value each year on account of uncontrolled floodwaters, not only the crop loss, but we are losing the rich topsoils. As to the improvements, at one time we had a fine feed yard on the lowland; now, it would be impossible to think of feeding cattle there as the water sometimes is 3 feet deep. A complete new channel is being cut through the best field on this 200 acre farm.

We need flood control now.

Respectfully submitted this 19th day of October 1951.

V. R. GREEN, *Tenant.*
MARY F. MORGAN, *Owner.*

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska,
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in sections 9, 15, 16, township Lebanon, range 26, located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:

1950	$700
1951	2,400
Total	3,100
Soil loss total estimated for 3 years	1,000
Improvement loss such as fences, bridges, buildings, total, 3 years	500

Water of the 1951 flooding all came down the creek from Kansas.

Respectfully submitted this 21st day of September 1951.

J. S. DAFFER, *Lebanon, Nebr.*

HON. CARL T. CURTIS,
Representative, First Congressional District of Nebraska,
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 10, township Lebanon, range 26, located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1950	$120
1951	320
Total	440
Soil loss total estimated for 3 years	-----
Improvement loss such as fences, bridges, buildings, total, 3 years	-----

Water that flooded in 1951 came down from Kansas.

Respectfully submitted this 21st day of September 1951.

J. L. FIECHTER, *Lebanon, Nebr.*

HON. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in sections 11 and 14, township 1, range 27, located on the Beaver Valley in the county of Red Willow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$2,340
1950	
1951	4,500
Total	6,840
Soil loss total estimated for 3 years	150
Improvement loss such as fences, bridges, buildings: total 3 years	100

Most of the water in the 1951 flooding came from Kansas.

Respectfully submitted this 21st day of September 1951.

ALBERT NICHOLSON, *Lebanon, Nebr.*

HON. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 17, township Lebanon, range 26, located on the Beaver Valley in the county of Red Willow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution

will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:

1949	
1950	
1951	$2,560
Total	2,560
Soil loss total estimated for 3 years	1,500
Improvement loss such as fences, bridges, buildings: total 3 years	100

Have just farmed place 2 years. All rain causing this damage was at the headwaters of the Beaver Creek.

Respectfully submitted this 21st day of September 1951.

GEORGE C. WARNER, *Lebanon, Nebr.*

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–1951:

The farm either owned or operated by me consists of one-half section, located on the Beaver Valley, in the County of Redwillow, State of Nebraska.

These floods have occurred for many years, but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of Beaver Valley.

Crop damage:

1949	$5,000
1950	2,000
1951	10,000
Total	17,000
Soil loss total estimated for 3 years	300
Improvement loss such as fences, bridges, Buildings: Total 3 years	100
Total loss	17,400

Our farms here on the Beaver Valley are badly in need of soil conservation, we need attention and help in forming some kind of flood control, I understand this valley is being considered in the over-all plan in this watershed district. One look at the damage by soil loss and crop loss in the past years would explain more than 1,000 words written about it.

It needs your attention now.

Respectfully submitted this 18th day of October 1951.

CARL E. SIMONSEN.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 17, township 1, range 26, located on the Beaver Valley in the county of Red Willow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$800
1950	550
1951	3,000
Total	4,350
Soil loss total estimated for 3 years	600
Improvement loss such as fences, bridges, buildings: Total 3 years	50

My opinion is there should be dams built on the Beaver Creek the same as on the Republican River.

Respectfully submitted this 4th day of October 1951.

M. C. SPRINGER.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 33, township 1, range 28, located on the Beaver Valley in the county of Red Willow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$2,800
1950	3,500
1951	5,000
Total	11,300
Soil loss total estimated for 3 years	5,000
Improvement loss such as fences, bridges, buildings: Total 3 years	1,500

Above does not include the expense of replanting with resulting immature crops.

Respectfully submitted this 16th day of October 1951.

FRED W. CLARK, *Owner.*
ELDON BROWN, *Renter.*

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 9, township 1, range 27, located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$1,200
1950	850
1951	2,700
Total	4,750
Soil loss total estimated for 3 years years: Hard to estimate. Terrible.	
Improvement loss such as fences, bridges, buildings: Total 3 years	400

We have had 11 floods this year. All have come from the headwaters of the Beaver Creek. This could all be stopped with a dam somewhere west of us.

Say between Cedar Bluffs and Traer. The valley is narrower there and would not spoil too much farming ground.

I estimate the big loss is cutting ditches and holes in the valuable bottom ground.

Respectfully submitted this 17th day of October 1951.

BURR HENTON.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATIVE ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 18, township 1, range 27, located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$1,200
1950	1,000
1951	6,000
Total	8,200
Soil loss total estimated for 3 years	3,000
Improvement loss such as fences, bridges, buildings: Total 3 years	500
Total	11,700

There is a large loss in brome pasture and cattle from not being able to use the pasture because the water covered the pasture a good part of the time in 1951.

Respectfully submitted this 19th day of October 1951.

WYCKOFF BROS.

FARM NO. 2

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska,
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 24, township 1, range 28, located on the Beaver Valley in the county of Red Willow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$1,200
1950	400
1951	2,500
Total	4,100
Soil loss total estimated for 3 years	400
Improvement loss such as fences, bridges, buildings: Total 3 years	150
Total loss	4,650

We need some flood control and are willing to cooperate in any way.

Respectfully submitted this 11th day of October 1951.

GALLATIN BROS.
J. E. GALLATIN.

FARM NO. 3

HON. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 19, township 1, range 27, located on the Beaver Valley in the county of Red Willow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$2,000
1950	1,500
1951	5,500
Total	9,000
Soil loss total estimated for 3 years	500
Improvement loss such as fences, bridges, buildings: Total 3 years	1,000
Total loss	10,500

Dam collapsed from flood and every year it deposits weed seed which is very hard to control.

Respectfully submitted this 11th day of October 1951.

GALLATIN BROS.
J. E. GALLATIN.

HON. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 15, township 1, range 27, located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$600
1950	700
1951	1,350
Total	2,650
Soil loss total estimated for 3 years	700
Improvement loss such as fences, bridges, buildings: Total 3 years	200
Total loss	3,550

Some of the best of this farm is going down to the Gulf never to be recovered. Good topsoil is hard to replace and this valley is losing plenty of it.

We need attention—NOW.

Respectfully submitted this 19th day of October 1951.

EARL SHAW.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm owned by me is located in section 18, township 1, range 27, located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$200
1950	500
1951	500
Total	1,200
Soil loss total estimated for 3 years (6 inches)	300
Improvement loss such as fences, buildings: Total 3 years	100
Poultry and egg losses	200
Total	1,800

The percentage loss on this report is large when compared to the acreage of only 8 acres.

Respectfully submitted this 9th day of October 1951.

F. H. HORTON.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm operated by me (300 acres) is located in section 8, township 1, range 27, located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years, but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$2,000
1950	3,000
1951	4,000
Total	9,000
Soil loss, total estimated for 3 years	5,000
Improvement loss such as fences, bridges, buildings: Total, 3 years	500
Total loss	14,500

Needless to say as a farm renter I find it a uphill job to produce at any profit on land that is ruined by floodwaters, which causes much extra planting expense of seed and equipment and generally it comes at a time of year when it is too late to expect much from replanting. The worst part as I see it is the topsoil loss and the ditches which, unless something is done, will forever get worse and eventually the land will not be worth the taxes. Some plan of flood protection surely would be a paying proposition for this valley.

Respectfully submitted this 10th day of October 1951.

SANFORD LOCKHART.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$3,000
1950	3,000
1951	3,100
Total	9,100
Soil loss total estimated for 3 years	1,000
Total loss	10,100

Unles we get some help on this flood control in this Beaver Valley this land I bought is not going to pay out very well. Surely with the soil-conservation programs in our Government we should have some attention to a valley with such good soil that is being ruined each year by floods that could be controlled for the good of all.

Respectfully submitted this 18th day of October 1951.

ANDY FOLEY.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owner or operated by me is located in section 11, township 1, range 26, located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$1,000
1950	1,000
1951	1,000
Total	3,000
Soil loss total estimated for 3 years	1,000
Improvement loss such as fences, bridges, buildings: Total, 3 years	300

Thirty acres of brome grass sown in 1949 fall—not much pasture in 1950. The 1951 two floods have almost killed same and will have to start over on same at no small cost for seeding.

Respectfully submitted this 12th day of October 1951.

EARL MORRIS.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 1, township 1, Range 26, located on the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$6,000
1950	5,000
1951	7,500
Total	18,500
Soil loss total estimated for 3 years	2,000
Improvement loss such as (fences), (bridges), (buildings): Total 3 years	500
Total loss	21,000

We are sure that when the proper authorities sees the loss in this valley caused by floodwaters that could be averted something will be done to save the farmland from washing down to the gulf of Mexico.

Respectfully submitted this 13th day of October 1951.

Signed: R. B. RYAN.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 6, township 1, range 25, located on the Beaver Valley in the county of Furnace, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$4,000
1950	3,500
1951	5,000
Total	12,500
Soil loss total estimated for 3 years	500
Improvement loss such as fences, bridges, buildings: Total, 3 years	150

I have owned this farm for 6 years. Two years the corn made 80 bushels to acre and 4 years it was completely flooded out on 65 acres.

Respectfully submitted this 20th day of October 1951.

H. E. MICHALS.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures, regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 17, township 1, range 27, located on the Beaver Valley in county of Redwillow, State of Nebraska.

These floods have occurred for many years but as a damage basis we are using the last 3 years and are submitting the fact to you in the hope that a solution will be forthcoming that will have our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$500
1950	300
1951	8,000
Total	8,800
Soil loss total estimated for 3 years	2,500
Improvement loss such as fences, bridges, buildings: Total 3 years	500
Total	11,800

I feel that part of this damage could have been prevented by some means of water storage.

Respectfully submitted this 7th day of October 1951.

MAX O. FENTON.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 32, township 1, range 28, located in the Beaver Valley in the county of Redwillow, State of Nebraska.

These floods have occurred for many years, but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	
1950	$1,562.50
	520.00

Respectfully submitted this first day of October 1951.

N. E. WEYENETH.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 31, township Wilsonville, range 25, located in the Beaver Valley in the county of Furnas, State of Nebraska.

These floods have occurred for many years, but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

	Acres	
Crop damage:		
1949	25	
1950	25	
1951	50	
Total	100	[1] $5,000
Soil loss total estimated for 3 years		300
Improvement loss, such as fences, bridges, buildings: Total, 3 years		300

[1] Approximate.

Bad ditches washed out of creek bank across field.
Respectfully submitted this 20th day of October 1951.

ROSWELL MCCOMB.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in section 16, township 1, range 27, located in the Beaver Valley, in the county of Red Willow, State of Nebraska.

These floods have occurred for many years, but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$5,000
1950	2,500
1951	10,000
Total	17,500
Soil loss total estimated for 3 years	1,000
Improvement loss such as fences, bridges, buildings: Total, 3 years	500
Total loss	19,000

These floods are getting worse each year and will until all of the large canyons are damned to hold back the water.

Respectfully submitted this 23d day of October 1951.

Mrs. WALTER REMINGTON.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in sections 9 and 16, township of Lebanon, range 26, located in the Beaver Valley, in the county of Red Willow, State of Nebraska.

These floods have occurred for many years, but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$600
1950	600
1951	1,125
Total	2,325
Soil loss total estimated for 3 years	500
Improvement loss, such as fences, bridges, buildings: Total 3 years	100

1951 floodwater came down creek from Kansas; creek channel widening fast.

Respectfully submitted this 16th day of October 1951.

F. A. TIGARD.

Hon. CARL T. CURTIS,
Representative, First Congressional District of Nebraska.
BUREAU OF RECLAMATION.
CORPS OF ARMY ENGINEERS.
REPUBLICAN VALLEY CONSERVATION ASSOCIATION.

I submit these facts and figures regarding flood damage caused by the Beaver Creek flooding in the years 1949–51:

The farm either owned or operated by me is located in the county of Red Willow, State of Nebraska.

These floods have occurred for many years, but as a damage basis we are using the last 3 years and are submitting the facts to you in the hope that a solution will be forthcoming that will save our soil and crops and protect the future of the Beaver Valley.

Crop damage:	
1949	$1,000
1950	0
1951	1,700
Total	2,700
Soil loss total estimated for 3 years	1,000
Improvement loss, such as fences, bridges, buildings: Total 3 years	0

Ninety-nine percent of the corn on this farm was lost in the 1951 flooding. The only income of this farm this year is a small acreage of alfalfa on second bottom.

Respectfully submitted this 19th day of October 1951.

CLYDE ZINK.

LOGAN COUNTY SOIL CONSERVATION DISTRICT,
Oakley, Kans., October 30, 1951.

To: Mr. Robert C. Bird, executive secretary, WKDA.
From: Supervisors of the Logan County Soil Conservation District.

It is our opinion that the best way to control floods and the terrific amount of erosion and sedimentation caused by floods is to control the water where it falls.

As one farmer so aptly put it, he wouldn't give a dime an acre for his soil after it reaches eastern Kansas or the Mississippi River.

We believe that the best way to prevent floods is to put the soil in a condition conducive to the highest amount of water intake. The excess water that is not taken into the soil should be controlled by terraces, farm ponds, and grassed waterway that will deliver the water to the main water courses without causing serious damage while reaching the main streams and rivers. The excess water can then be controlled by larger structures without the great amount of erosion and sedimentation that now takes place.

More educational work and meetings for farmers, implement dealers, and businessmen, showing with pictures and literature the damages done by water erosion, also the benefits of soil-conservation measures.

JAKE UHRICH, *Chairman.*
PAUL HODGES, *Secretary.*
AUGUST STOECKER, *Member.*

Mr. STRUNK. May I have permission to introduce Dr. Stevenson, of the Norton, Kans., Chamber of Commerce?

Mr. HOPE. We will be glad to hear from Dr. Stevenson.

STATEMENT OF DR. STEVENSON, NORTON CHAMBER OF COMMERCE

Dr. STEVENSON. Mr. Chairman and members of the committee, I have been out in the short-grass country for a good many years. I am a pill peddler by trade. I have some land and have had some experiences with floods and soil runoff which is apparent all over this section of the country.

I think one thing that we have never taken into consideration and I have never heard mentioned at one of these meetings is the fact we have lost more topsoil in the last 12 or 15 years from this area than was lost in the 60 years before. When the Government went to paying the poor farmers during the drought years a dollar and a half an acre to summer-fallow the hillsides, the first rains washed the topsoil down to the streams and valleys.

This job is a tremendous job, and you gentlemen of the committee have a big responsibility, not only to this area but all over this western

country wherever this water runs. We have water out here—plenty of it. If we could conserve it, we would have tremendous benefits from it. In my opinion, this idea of runoff and soil conservation is very important. Everybody is aware of that, but what we are after is getting something done about it.

I live in a county of 8,000 population. We have a little Prairie Dog Creek down there and the North Solomon. This is a little county and last year—and this isn't the only time we have been flooded out—we had a $165,000 loss this year and this was certified to by the railroad, the highway authorities, the county engineer, and the city officials. So, we have a problem out in the West. We need this water for irrigation and the stabilization of agriculture. You all know that.

This is a big problem and a big job for the Army engineers. It is a big job for the Bureau of Reclamation. The only fault I have to find with the Agriculture Department of the Government is that they are about 50 years behind our wants and our needs. We had soil here 50 years ago. It isn't here now. So, these agencies all working in cooperation, with the Army engineers prodding, and the Bureau of Reclamation prodding the Agriculture Committees to getting something done to preserve these reservoirs which are necessary in our over-all program, we will begin to regain that which we have lost. We want to get this under control.

Now, the only thing we can do when we go down to Kansas City and Lawrence and Topeka is to apologize to those folks and tell them we sent them all the old clothes and what money we could afford to relieve their suffering, because it was our water—not our dam waters—but lack of dams that has created the devastation which has occurred in the Missouri Basin.

I am glad to have had the opportunity of being here today. I play on both sides of the State line. I belong to the Republican Valley conservation and am director in the Reclamation Association of the State of Kansas. There is no need of quarreling as to who is going to get the credit for this. If the Agriculture Department will get busy and get behind the Bureau of Reclamation and Army engineers to get their appropriations through, we will begin to realize benefits. There is a job to keep them all busy for the next 20 years.

The CHAIRMAN. You see I don't live in this Great Plains country. I live down in central Texas and I am not too familiar with your fallowing practices as practically everyone in the audience is. I get from your statement that you don't approve of fallowing wheatland?

Dr. STEVENSON. I approve fallowing wheatland which has less than one-half of 1 percent slope. You kill all the vegetation on the land. The object of that vegetation is to catch the rainfall that falls in one particular year and save it for the next year's crop. But when the rainfall comes on a 5-, 8-percent slope, the top soil goes down the creeks and rivers.

The CHAIRMAN. Do you think that is something that should be controlled with such matters as strip cropping and terracing and those practices, or would you suggest that we either plant wheat without fallowing on those slopes, or that we should go out of wheat business on the slopes? I don't know where you lead from your discussion.

Dr. STEVENSON. That is the thing to be worked out by the Department of Agriculture. However, I believe we should plant grass on these slopes instead of fallowing. We have lost the top soil.

The CHAIRMAN. You say you can't grow grasses on the slopes?

Dr. STEVENSON. Yes, you can. That is the solution for that. The Department of Agriculture is working that out. They are begging the farmers to plant more grass on the land.

The CHAIRMAN. They are doing that in my country, too. A man from a distance never does know the local problems, but most of our farmers say they can't afford to plant any grasses on their land.

Dr. STEVENSON. That is what they say in my county, too.

The CHAIRMAN. They say they have to have a cash crop in order to pay their doctor bill. [Laughter.] I don't mean anything personal.

Dr. STEVENSON. I understand.

The CHAIRMAN. How do you suggest that we handle it? I know the Department of Agriculture has suggested more grass.

Dr. STEVENSON. They are going to have to have more appropriations. Their program should come first. I remarked previously that they are 50 years behind. I would like to give you a little example of that. We have the PMA and Soil Conservation Service. I had the pleasure of having lunch with the man in charge of that. I understand they are giving money to the farmers to build farm ponds. They are paying about 70 percent—or up to 70 percent of construction. All right. You get up in a plane over this country east of here; it is rather rough, and the ponds look like diamonds and plenty thick. However, I don't believe they are the answer to the flood-control problems. I have also noticed that there is not a foot of storage in the dams in my section of the country allocated for flood control. There should be multiple-purpose type dams. That can be achieved by putting a dam halfway up to the spillway and giving the dam a chance to drain out to some extent, so when a flood does come you have kept half of it for storage to take care of the surplus water. I also understand that quite a few of the farmers fail to take all of the money allotted to them for the building of the farm ponds.

The CHAIRMAN. Now, you are talking about something which I am familiar with. We do build the farm ponds. I have heard that the farmers in your section here do not take all the PMA money allocated to them. In my State, we only give 50 percent to cover the costs in construction of the farm ponds, and they take it all. I am surprised they don't take the entire 70 percent allocated.

Dr. STEVENSON. I am surprised they would short-change Texas that much inasmuch as it is a Democrat State.

The CHAIRMAN. We don't feel we are short-changed because we feel as long as we get the tanks built for 50 percent of the total cost, that the Government is going a long way in helping us. We take up all the money available and thereby getting more ponds.

Now, if you required that the ponds be maintained at 50-percent flood storage and only 50-percent usable to the landowners, you would have to increase the percentage of what the Government pays, because fewer farmers will go out and build. However, the construction would not be nearly so great if we were getting nothing for the portion we ourselves would use. In other words, if I would excavate a thousand yards of dirt and was required to keep the top 500 yards empty for flood storage, I will have paid for the 500 yards I use, and you won't get as many ponds.

Dr. STEVENSON. But, if you didn't get as many ponds built, you would still be attempting to solve your flood-storage problem, which you aren't doing down there now.

The CHAIRMAN. You are correct on that. Most of the time you don't get any flood storage. Obviously, you get some, but generally not at the right time. Right now there is a lot of flood storage in Texas on the ponds, but after the rains come, there is not much storage. But, you would suggest the Government pay a larger percent. Say three-fourths or 80 percent of the cost of building the stock ponds and require half of them to be maintained as flood storage?

Dr. STEVENSON. If the PMA and the Department of Agriculture is going to build the flood ponds, let's get double use, even if it is going to cost us more.

The CHAIRMAN. Do you suggest putting more into it?

Dr. STEVENSON. Yes.

The CHAIRMAN. Remember, we have been putting $285 million a year into it. This year the House voted to cut to something like $225 million next year, and there was strong sentiment and feeling that it should be cut even more, and many would cut it entirely. Do you suggest we increase it—increase the PMA payments to say $350 or $400 million—something of that order?

Dr. STEVENSON. If we are going to depend on the Department of Agriculture, and this is not finding any fault with them, in helping to control the floods aside from the terracing and throwing land back into production, I think it should be paid for. Because when you increase the flood storage of one of these ponds, you are not only benefiting that little area, you are benefiting it clear to the mouths of the rivers.

The CHAIRMAN. That is right. Do I understand you—and I am merely asking you because you are the one I can get ahold of at the moment—that it is worth while for the United States Government to increase the appropriations that we are making for the PMA by $100 million or even $150 million. You know we hear loud howls from the people; we are spending too much money. Do you think it is worth while?

Dr. STEVENSON. Yes; if they put into the specifications for flood storage in the dams.

The CHAIRMAN. Do you think that is one of the items for which you would be willing to pay more taxes?

Dr. STEVENSON. That is one of the things stated here this morning that will save the Pick-Sloan plan.

The CHAIRMAN. A lot of people say you have to have them but are not willing to pay for the program. Are you willing to pay the bill?

Dr. STEVENSON. Yes. Just like in baby cases. They like to have them but don't like to pay for them. I am a personal friend of your Judge Sturrock, head of the water resources in the State of Texas, and he isn't asking the Federal Government to pay anything on his program.

The CHAIRMAN. Unfortunately, his not asking the Federal Government to pay anything is because his program is a power program and not a flood program.

Mr. HOPE. Let me follow up on what Mr. Poage has said about this. Supposing we can't get any more money than we are getting now for

the over-all flood-control program. Would it be your idea that we should spend a larger percentage of what we do spent for the agricultural program to keep the water on the land here where it falls, building farm ponds and so forth, than we are spending at the present time, and less on the large dams?

Dr. STEVENSON. The large dams have a definite place, and this word "comprehensive"—I don't know who originated that word; it is a fine word—but the large dams are absolutely necessary because when the water is surcharged and the ponds full, any additional rain becomes a runoff. And, I think that is a question that can be worked out from such meetings as this. Personally, I think the Agriculture Department should have money enough to get busy on their programs and bring them up to date, especially in the valleys where the dams are not completed.

I am very happy to live in the county of Kansas that has the greatest number of terraces and the second number of farm ponds.

Mr. HOPE. Then, as I understand it, you think if the over-all program is to be successful, there should be an apportionment of the expenditures between the programs to conserve the water on the soil where it falls and that of impounding it in the larger dams farther down the streams?

Dr. STEVENSON. Yes.

Mr. HOPE. And, you and I not being engineers or soil conservation experts, maybe can't say what the portion should be, but we think that is a matter which should be worked out by the people who know something about those matters?

Dr. STEVENSON. Yes, I think so.

Mr. HOPE. Any other questions? Thank you very much Dr. Stevenson for your statements.

Mr. STRUNK. We thank you gentlemen for coming out here and we are sure you will take back to Washington the report we want.

I am wondering if some of the costs of flood control wouldn't be repayable; also irrigation and conservation?

The CHAIRMAN. May I interpose here and say that it could not be repayable, at least for that part which is involved in flood control, except from the benefits that the general public receives. Take for instance the Bonny Dam that we visited yesterday afternoon. It is expected to keep a portion of the dam full of water but a large portion is to be kept empty. Now, the only part that the Bureau of Reclamation proposes to repay, as I understand it, is that part which is kept full of water. If you propose to keep a dam one fourth full of water you can say that amount is reimbursable. You can make it all reimbursable if you keep it full, but then you don't have any flood control. I believe we are only kidding ourselves when we think we can have flood control without paying for it. The taxpayers have to pay for it. That is the point I wanted to make to the doctor. I wasn't intending to say anything about him personally when I said that about paying the doctor bills. I hope he understands that. However, these things have to be paid for by the taxpayers. And one of the things this committee has to know is how much the people are willing to pay in order to get these things done. You can get a great many things done if you pay the bill, but you can't if you are not going to pay the bill. And, unfortunately, my experience in Congress has been

that often times the very organizations—and I want to say organizations rather than individuals—demanding most of Congress in the way of expenditures on structures and improvements, are also the same organizations that appear before Congress to complain about the tax bill and the money that is necessary to pay for the things that we are buying for the public good. I think we have to have some understanding as to what you want your Congress to buy and pay for.

Mr. STRUNK. Did you see this comprehensive plan of development of a river drainage basin—this map?

The CHAIRMAN. Yes.

Mr. STRUNK. That is from the headwaters down: not from the bottom up. You pointed out the Bonny Dam. Maybe Bonny Dam can't stand on its own feet, but perhaps this dam [pointing to map] down here could stand a hundred percent on its own feet—maybe a 125 or even 150 percent. When you take that whole plan into consideration, it justifies itself.

The CHAIRMAN. I think so. However, you can justify a thing without saying it is going to be self-liquidating. But, the dams can't be unless they are full of water.

Mr. STRUNK. You are taking an individual dam. We are taking a plan. That is what you are out here for. You are to make a survey to find out what the hell you can do. This is it. You have it in the Solomon, you have it in the Kaw, and surely you have it in the Missouri, and you can't pick out one and say that this dam isn't practical.

The CHAIRMAN. I hope you are not getting me wrong. I think they are highly desirable, but I think it is a great mistake and I feel we are slowing down the improvement of all conservation, all flood protection, control, and prevention, when we take the position that we can build a dam out here, keep it full of water, and have flood control. That is exactly what Mr. Hill said this morning. On the other hand, if you take the position that you are going to keep the dams empty, then you are only kidding yourself. A dam that is kept empty produces nothing. It must be paid for in taxes. I think it is the greatest mistake we can make in assuming we can have all the benefits without taxes.

Mr. STRUNK. On the other hand, so much for an acre-foot on the land?

The CHAIRMAN. Yes, for irrigation. However, if you keep the dam empty, there won't be a farmer in the country who will pay 10 cents a foot if you have an empty dam.

Mr. STRUCK. Take a look [points to map]. They are all multiple-purpose dams.

The CHAIRMAN. The farmers won't pay one thin dime for an empty reservoir.

Mr. STRUNK. There are no empty reservoirs.

The CHAIRMAN. The Bonny Dam has 200,000 feet that is empty.

Mr. STRUNK. Not filled up?

The CHAIRMAN. Never will be filed except in cases of high floods. And, if you don't leave a considerable portion of it empty, you won't have protection when the floods come. A full reservoir won't give you flood control.

Mr. STRUNK. Do you know how much irrigation from the Bonny Dam?

The CHAIRMAN. 132,000 acre-feet.

Mr. STRUNK. The rest is flood control?

The CHAIRMAN. Yes.

Mr. HOPE. Are there any other questions? Thank you very much, Mr. Strunk.

The next witness will be Mr. Paul W. Griffith, associate dean of extension, Kansas State College. Mr. Griffith.

STATEMENT OF PAUL W. GRIFFITH, ASSOCIATE DEAN OF EXTENSION, KANSAS STATE COLLEGE

Mr. GRIFFITH. Mr. Chairman, members of the committee, ladies and gentlemen, I am here representing Dean Williams, director of the Kansas Extension Service, who was selected by the directors of the 10 States who are involved in the Missouri Basin to present an over-all comprehensive educational program as it fits the agricultural program in the Missouri Basin.

(The following statement was read by Mr. Griffith:)

STATEMENT OF L. C. WILLIAMS, DIRECTOR OF THE KANSAS COOPERATIVE AGRICULTURAL EXTENSION SERVICE, AND REPRESENTING THE AGRICULTURAL EXTENSION SERVICE DIRECTORS OF THE 10 MISSOURI RIVER BASIN STATES

The Cooperative Agricultural Extension Services of the Missouri River Basin States were given an opportunity to participate in the development of the Missouri River Basin agricultural program, which has been printed in House Document No. 373, Eighty-first Congress, first session, and the directors of these Extension services have expressed their approval of this statement here quoted, which appears on pages 30 and 31 of this document:

THE PLACE OF THE AGRICULTURAL PROGRAM IN COMPREHENSIVE MISSOURI BASIN DEVELOPMENT

The basin-wide agricultural program recommended in this report is designed to develop, conserve, and use efficiently the land, water, and forest resources of the basin. It includes provisions for needed measures to complement the plan, approved by Congress in the Flood Control Act of 1944, for flood control, navigation, irrigation, hydroelectric-power development, and related water uses now being prosecuted in the basin by the Corps of Engineers and the Bureau of Reclamation.

The recommended agricultural program will reduce the rate at which major reservoirs fill with sediment. It will contribute to reduction of flood and related damages along the thousands of miles of tributary streams that will lie above these major reservoirs. It will assist in bringing into full and efficient use the new irrigated lands, help solve the drainage problems on lands behind the levees, extend aid to farm families who will be moving from reservoir areas, and in many other ways complement and make more effective the engineering program. Improved and more stable incomes that result from more efficient use of land, water, and forests will also make it possible for farmers to take fuller advantage of the opportunities provided by the engineering developments; in particular, it will enable them to utilize most efficiently the electrical power that is to become available and to repay the obligations incurred in expanded irrigation.

These are essential functions that the agricultural program will perform in the total development of the Missouri Basin resources in addition to the intrinsic worth of conservation and farm and forest improvements.

This report sets out a program designed to benefit all the farm families in the basin and indirectly to benefit all farm communities and related business interests; a program which, with the other Federal activities and the efforts of all the State governments and the people of the basin, will make a major contribution in the efficient development of the Missouri Basin.

A program of extension education, which is an extremely important phase of the Missouri River Basin agricultural program, is described on pages 153 to 160, inclusive, House Document 373, and I here quote from this section:

PROGRAM OF EXTENSION EDUCATION

Rapid progress in development of the agricultural resources of the Missouri Basin is largely dependent upon the active participation of farm families and upon the active cooperation of farm groups, civic and commercial organizations, local, county, and State institutions, and governmental agencies. Participation and cooperation can be effected through widespread knowledge of objectives of the program, general agreement on the functions of all agencies, and the acceptance of both farm people and governmental agencies of the special responsibilities of each. This widespread knowledge can be established through educational means.

Full utilization of the facilities created by the basin-development program will be realized when the people living in the areas understand the scope of the program and the possibilities for a better standard of living it assures. It is particularly important that the people understand from authoritative sources how the proposed structures, changes in farming systems and practices, facilities to be made available, and other features of the development program will affect them personally, the community, the region in which they live, and the United States as a whole. This understanding, or the lack of it, is the key to the manner in which people in a democracy cooperate with their Government in programs for the common good. It can be best established through educational channels.

The structures built for the purposes of irrigation and flood control will make possible many facilities which can be used to improve the agriculture and the living standards in the basin. Agricultural agencies and institutions and farm people and their organizations have the responsibility for developing the best uses of the facilities thus made possible. Therefore, it is of primary importance that each farmer study how the availability of water or electric current will affect his farm, and for each group of farmers who live on or adjacent to a construction project to study and determine the means by which that project can bring them the maximum amount of benefit and stability.

Phases of the development program involving changes of farm management, the adoption of new cultural practices, utilization of the byproducts of conservation, such as hay or pastures, and other changes on privately owned land, including the manner of living of the people, are particularly dependent upon understanding the "why" of such changes if the proposed changes are to become established farm and home practices. This understanding can be attained most quickly through educational effort. Thus educational work is essential to any program that produces lasting results.

The educational program should precede and be kept in step with the developments of the various construction projects, land treatment, and other accelerated programs in the basin. The people must be constantly informed through contacts with official sources of information. This educational service should be available to all the 582,000 farm families in the basin. In addition, urban people should be informed of the importance to them of the devolpment of these natural resources.

EDUCATIONAL PROBLEMS

There is a lack of general public understanding of the development proposals and appreciation of the inherent possibilities for increased income and improved living standards. Most people don't realize the adjustments in farming, range use, and forest-land management that must be made to protect public investments in the new dams, reservoirs, and other structures, and insure full and efficient use over a long period of time.

Educational needs are of three types: (1) To develop and to expand participation of farm and civic leaders working with representatives of all agencies in planning the development of the Missouri River Basin; (2) to assist farm people, ranchers, and forest and woodland users to understand and adopt a wide range of new techniques of soil and water conservation and management extending from the upper mountain watersheds to the lower humid areas of the basin; (3) to assist farm people to realize better living standards and farm efficiencies made possible through more stable income, availability of electricity and improved technology, and to take advantage of expansion in industrialization that is expected to take place in the basin.

Adequate extension education is essential to the accelerated Missouri River Basin agricultural program. The educational phase of the program cannot be successfully conducted in the Missouri River Basin States without increased per-

sonnel at county and State levels. Table 33, page 160, House Document No. 373, gives an estimate of personnel requirements and costs for the program of extension education for a 30-year period. This table has been compiled on the basis of estimates made by the extension services of each of the States concerned. The table is here included:

TABLE 33.—*Estimated personnel requirements and costs for the program of extension education*

Year of operation	Number of specialists	Number of county workers		Cost estimates		
		Agricultural agents	Home agents	State	Federal	Total
First	15	100	30		$796,500	$796,500
Second	25	150	40		1,191,500	1,191,500
Third	30	200	50	$154,900	1,394,100	1,549,000
Fourth	35	250	60	190,550	1,714,950	1,905,500
Fifth	40	300	70	339,300	1,922,700	2,262,000
Sixth	45	325	80	372,150	2,108,850	2,481,000
Seventh	50	350	85	535,500	2,142,000	2,677,500
Eighth	55	375	90	574,800	2,299,200	2,874,000
Ninth	60	400	95	767,875	2,303,625	3,071,500
Tenth	60	400	100	773,500	2,320,500	3,094,000
Each year after tenth	60	400	100	1,000,000	2,094,000	3,094,000
30-year cost				23,708,575	60,073,925	83,782,500

It is the opinion of the extension directors that personnel should be added in each of the years as shown in the table, and that funds originated from Federal appropriations for this program should be allotted by the Secretary of Agriculture to the States in such amounts as he deems appropriate. In other words, this distribution of Federal funds to the States should be on the basis of program needs rather than on the basis of existing formulas applicable to other Federal grants-in-aid. This paragraph is directly quoted from page 160 of House Document No. 373:

"It is recommended that the Secretary be authorized to carry out in cooperation with the States the types of educational work outlined herein, and that the funds required to supplement the staff available under existing authorizations shall be allotted by the Secretary to the States in such amounts as he deems appropriate."

In answer to a questionnaire recently distributed ot States located in the Missouri River Basin, the directors of the Cooperative Agricultural Extension Services—

1. Endorsed the approved extension program developed by the Missouri Basin Regional Extension Committee and printed in House Document 373.

2. Recommended that educational activities in connection with this program be under the direction of the extension services in each of the States and that Federal funds which may be provided for this purpose be allotted to the extension services in the States by the Secretary of Agriculture through the Federal Extension Service.

3. Reported that approximately $78,000 in State appropriations was now being used each year for extension educational work in the Missouri Basin of the type indicated in the report as needing to be accelerated, and that a total of $90,155 in Federal funds was being used for the same purpose on an annual basis.

4. Estimated that requests for funds for the Missouri River Basin extension educational program totaling about $137,980 each year for the first 5 years would be made to the legislatures of the States concerned. After the first 5 years the extension directors estimated that the request would total approximaely $700,000 each year.

5. Recommended that all Federal appropriations made directly to the Federal Extension Service for distribution to the States in furtherance of the Missouri River Basin accelerated extension educational program be distributed among the States on the basis of the extent of the changes in land-use practices required by the program.

Mr. HOPE. Thank you, Mr. Griffith. Are there any questions?

The CHAIRMAN. Yes; I would like to ask a question or two. It seems as though I am a man who is making himself rather unpopular. I wonder if you would consider that the expenditures that you recommend would be paid for on what has been called a self-liquidating basis?

Mr. GRIFFITH. No; I presume it would be educational funds to accelerate the program. It was brought up today that we are losing ground in lots of ways in controlling erosion, getting good land use, and the protection of some of these structures. Therefore, we need to step up the operational procedures; also, the educational program in trying to get people to adopt practices more rapidly.

The CHAIRMAN. I think that is right, too, and I understand that. I am not raising the point that the expenditures are not desirable, but I am trying to keep the record straight so that those here will not go away with any misapprehension that we can bring to any community benefits without somebody in the form of a taxpayer to pay the bill. Oftentimes the investments are desirable and worth while, but we have to pay the bill in the final analysis. However, if we can increase our income, at the same time paying the bill and wind up with a surplus and betterment of good things in life, why, I think it is highly desirable. But I think we are delaying and hindering and weakening the chances of getting a program if we kid ourselves that we can get it for nothing.

There is one other thing I want to ask you about. I notice the recommendation is first made in the House docket and then by the association for a change in the formula for the distribution of extension funds.

Mr. GRIFFITH. I think their thinking was this in connection with these particular funds. Our formula is now according to the States as a whole, and as was brought out here and as most of us know, there are certain areas more critical than others. We should decide where the greatest need is and then put it there, rather than spreading it out over the entire area and maybe not give a critical area enough, and maybe some areas more than they need.

The CHAIRMAN. The questions in that connection are should that distribution be made at Washington, and I believe the law is that the Secretary of Agriculture make it or it should be made at State level, allowing the States to determine for themselves which are their more critical areas.

Mr. GRIFFITH. I think it should be made in a comprehensive plan according to critical needs of the States, and then letting the States go from there to pinpoint more locally their needs. In fact, I think that is the Bureau's statement, that it be made to the States and then letting the States determine their own needs locally.

The CHAIRMAN. I would think so. However, if we use a different formula in putting money into the Missouri Valley from that which is used in the rest of the country, we are very soon going to be told politically to give the other sections the same treatment.

Mr. GRIFFITH. This isn't the regular program.

The CHAIRMAN. I understand that. However, you must remember the Missouri Valley isn't the only part of the United States involved in the agriculture flood prevention program, either. Would you then

suggest that we change the general law so not only would the money be distributed by a new formula in the Missouri Valley, but in all the areas that are determined to be the critical flood producing areas? In other words, change the formula of distribution?

Mr. GRIFFITH. Maybe on particular projects.

The CHAIRMAN. There are 11 in the United States now. If there is to be an accelerated program, whether in the Arkansas Basin, the Missouri Basin, or the Columbia Basin, the distribution should be according to need rather than a flat sum; is that right?

Mr. GRIFFITH. Yes.

The CHAIRMAN. And you would extend it to the entire United States?

Mr. GRIFFITH. Yes; I would.

Mr. HOPE. Thank you very much, Mr. Griffith.

Our next witness is Mr. Donald Christy, of the Scott City Chamber of Commerce, Scott City, Kans. Mr. Christy.

STATEMENT OF DONALD CHRISTY, SCOTT CITY CHAMBER OF COMMERCE

(Pictures and charts submitted by Mr. Christy have been filed with the subcommittee.)

Mr. CHRISTY. Mr. Chairman, members of the committee, and ladies and gentlemen. I would like to ask one thing. Unfortunately, I didn't have a chance to make a picture that could be shown, but I do have a couple of copies of the basin. If you gentlemen would care to look at them, I believe you will be able to see a part of the problems involved.

The White Woman Basin is rather unique in that it is a creek with a beginning but no end. Or at least it didn't have until recently. It starts out in Colorado and flows down into western Kansas for about 75 miles and then spreads out into a basin there. You might call it a lagoon—if you were far enough away it might look like a lagoon. But nevertheless it runs down there and has no apparent drainage from the lake. In recent years we have had some water in the basin, and as I have said, it comes down from Colorado, but mostly from western Kansas and sometimes just from the immediate vicinity, spreading out over from a few hundred to a few thousand acres. Last year, however, it rained more up and down the basin than we had seen in a long time, and the water level became somewhat higher than it had been in the past. Somewhere around forty-eight and fifty-two hundred acres were inundated. Last year the wheat killed out in a large part of the area and it started raining in May. Well, in early June the White Woman Basin was filled up to about where it was the year before. Then, it rained a lot more. Statistically it couldn't happen, but it did. It raised about 3 feet. One week later it rained again and that would be impossible, but it raised it another 3 feet, covering an area of about 8,000 acres.

Now, looking at the geology of the thing. Sometime in the past, it has gone over south. And, as nearly as I can tell from the contour maps, that would be about 11,500 acres involved.

Now, there are two essential problems as far as that particular area is concerned. One of them is what to do with the water we have now. It isn't like a flood on a creek or river. A person has a flood and when

it is gone, either you have some buildings or you don't. You have some mud to clean out and then you can work the ground. Our flood came in June. The water is just a little lower now than it was then, but still high enough to give most of the buildings involved a continual pounding from the waves, which knocks off the plaster from the walls and the windows out. It really has messed things up. I think one of the boys put it very well. He said: "The cheapest way to rebuild is to flatten the whole mess and start over." And, that is all that is being left of some of those farm homes.

Now, there is a possibility that it could be drained. In other words, we thought that vertical drainage might work out. Mr. Wisner, who I see is here today, tried some of that, but we found out when a bucket is full of water you can't pour any more in. That is essentially what happened. The ground water came up to the level of the lake, or 8 or 10 feet above the surface of the ground. [Laughter.] Some of us found that the water came up from underneath when you pushed a hole in the ground and got nearly drowned in trying to save some of the buildings.

Now, the basin drains south. It has drained that way geologically for some time past. It could be done, but there is a question as to how much it would cost. It would take a survey to determine, but it is a possibility of carrying the water south. This would not only take care of this basin, but also a number of similar areas, and none so large that they couldn't be joined. This problem goes right on down past Garden City, Kans. That might be part of the over-all problem.

Now, my maps don't show all the information, but it seems to me that there is probably another six or eight thousand acres south of the basin, which could be enjoined as part of such a project. It looks like a hearing or at least a study should be made of the feasibility of making such a drainage.

The CHAIRMAN. How far would it drain?

Mr. CHRISTY. Approximately 35 miles. Only a short distance of that would be a major cut. In fact if the lake would raise 7 feet it would run over this time. And about 14 to 19 feet would probably take care of the major cuts, and the size would be, probably be, about the size of some of our larger trench silos, as nearly as I could estimate.

Now, I want to make another statement. This is an immediate problem of what to do with the water. The water that drains into this basin from about 40,000 acre-feet results from about 1 inch or less of rainfall. That puts the water into the basin.

This soil will hold a lot of water. There are those who believe we can put it there and keep it there forever. I understand that 1 inch of water is worth about 3½ to 4 bushels of additional wheat. That is a pretty good percentage to keep at home. We would like to have the soil conservation program fit right into the Department of Agriculture program. We believe that these two programs should encourage the building of ponds—farm ponds, where a man can use the water. Then there are ponds or lakes that are in the intermediate size between the big reclamation lakes and flood-control dams. I feel these undertakings would at least reduce the major floods. I feel that if these things had been done, the lake level would be approximately 2 feet lower than it was at its peak last summer. There would be about 2 feet less of water in it. In other words, I feel that soil con-

servation alone will not do the complete job. There are those who would like to credit soil conservation of being able to do the job, but I think that is a disservice to soil conservation.

I believe that is all, Mr. Chairman, unless there are some questions.

Mr. HOPE. Have you had any engineers on the job or any surveys made at all, either with the idea of getting rid of the present water or preventing future floods?

Mr. CHRISTY. There has been an engineering firm from Dodge City and several of us, I say us, I am supposed to be a qualified engineer even though I am a farmer now, that have been checking the contours and the flow, and things of that nature, and the results indicate that maybe it is worth while in carrying that water south. Now, whether it is feasible or not, would take more complete studies than we have done.

Mr. HOPE. Has this problem been taken up with the Army engineers at Albuquerque?

Mr. CHRISTY. Yes; we had men from Pueblo. Some of the Army engineers have even been back for rechecks. Just what they were looking into I don't know. However, they were back to recheck some of the possibilities. It is very evident that it is beyond the scope of the Kansas drainage law. In other words, your limitations by valuation, would no doubt prevent that type of development.

Mr. HOPE. Would the cost of your drainage ditch be so great that you couldn't finance it under any ordinary drainage ditch procedure?

Mr. CHRISTY. That is my belief. I could be wrong. That ditch wouldn't necessarily have to be all below ground once you get over the hump on the south. In other words, the dirt that is taken from the ditch itself might be used to a considerable extent in confining it to a channel. To what extent that could be done, I don't know. If that would work out it might make the cost considerably less than what they have estimated.

The CHAIRMAN. How much would you estimate the cost?

Mr. CHRISTY. Well, reaching up and getting it like that—I would imagine a half-million dollars.

The CHAIRMAN. Let me ask you if that is a very large sinkhole, similar to those they have down on the south plains?

Mr. CHRISTY. Maybe it is but probably not entirely. It would depend on what we figure would cause that lake. Now, this lake here, and a good many around it, are caused by an uplift just east of Scott City, extending north and south, and in fact extending north and south throughout most of Kansas. It has cut off the White Woman and consequently left a big lake there—the water over the period has filled it up and caused a basin.

Now, the geology boys believe that the other sinkholes on the high plains are also the result of an uplift or slip, in which the surface is depressed, which gradually creates a large sinkhole.

Now, that is the theory and in some cases that is not right and in others I am pretty sure it is.

The CHAIRMAN. Obviously, it is not the same thing down around Lubbock. There is no drainage there after you get away from some of the canyons.

Mr. CHRISTY. This deal extends about 75 miles west. It is part of an old stream shut off by an uplift.

The CHAIRMAN. Normally, what became of the water as it came down the stream? Did it sink into the ground in normal years?

Mr. CHRISTY. The basin is apparently recharged for that area. It came down and spread out over an area that is considered a flood area. From a few hundred years to a couple thousand. It was good grass land primarily—good western wheat. However, the water would come down and spread out over it and when the water table was down, it would actually find holes and form whirlpools where the water was going into the ground. It made a good many of us believe that it was an important source of recharge for that immediate irrigation area, and the ground water action at the present time bears that out.

Now, I don't have the exact acreage, but I expect there are about 3,000 acres left in grass, which has suffered no damage. The damage started when the water started to climb into the farm lands and more important when it started to climb into the buildings, railroads, and highways. And believe me it has been rough where it gets into property.

The CHAIRMAN. And, you say that when you drill down, instead of the water going down it comes up?

Mr. CHRISTY. It seeks its own level. One of the boys went to take his water pump out of the basin when the basin came up. The result was a 6-inch stream of water from the basin into his well as he lifted the pump out. You may laugh at this but we call that "coming up" when you drill a well.

Mr. HOPE. If I remember your statement correctly, the underflow is as high as the level of the lake at the present time. There is no chance for the water to seep away at the present time?

Mr. CHRISTY. I am afraid that the underflow which is coming from the west is actually contributing to the lake, because similar lagoons in the area have dried up considerably more, probably twice as much. That is probably because the water level has dropped twice as much as it has in this lake, but most of those lagoons are up well above the water table.

The CHAIRMAN. Where they could drain into this lake?

Mr. CHRISTY. If they drain. Some do and some drain very slightly. In other words, some are practically impervious, and some drain rather readily, depending on the way they were put together.

The CHAIRMAN. That question as to whether they were impervious at the bottom is what I had in mind. As you know, there is a practice of drilling the bottom of the small lakes in Texas; not to get water but to let the water go down to recharge the wells.

Mr. CHRISTY. Yes; I knew about that practice down in Texas.

The CHAIRMAN. But it is no good if you have too much below.

Mr. CHRISTY. If it is coming up. [Laughter.]

Mr. HOPE. Are there any further questions?

Mr. HILL. Yes; I have a question. Mr. Christy, is this increase in the volume of water that comes into the lake all due to surface water running into the lake?

Mr. CHRISTY. The original water that came in was surface water. Look at the map I gave you. Look at the rainfall charted for May and June—the first map. I think you will find that it rains about 11 inches on the Colorado line and increases to 17 inches down to Scott City for

the 2-month period. It was primarily the surface water that originally filled the lake. Now, with two wet years there is no doubt that ground water has been working in and helping to maintain the level, or at least preventing it to lower as fast as the other lakes do.

Mr. HILL. Is there any history of this area which would lead one to believe the water has been that high before?

Mr. CHRISTY. The oldest residents who had lived in this area for about 75 years had never seen anything like it. Thirty-eight hundred acres was the previous record to last year. Now, if you want to look at it from the geology standpoint, there is pretty good evidence that it has flooded south, but unless you were specifically looking for that sort of thing there is no reason for a man to believe the thing would fill up.

The CHAIRMAN. Is the Santa Fe Railroad still covered through there?

Mr. CHRISTY. They are hauling a lot of material in there trying to pull it out of the water. The last I heard was that they were going to try to have it opened by November 4 of this year.

The CHAIRMAN. They haven't been operating?

Mr. CHRISTY. No; they haven't. The refinery down there has been off the railroad all summer. They had to ship out by truck, and the highways weren't in any too good condition. In other words, it has just messed the whole thing up down that line, when she cut loose.

Mr. HOPE. Are there any further questions? Thank you very much, Mr. Christy.

The next witness is Dr. M. C. Cunningham, president of Fort Hays State College. Dr. Cunningham.

STATEMENT OF DR. M. C. CUNNINGHAM, PRESIDENT, FORT HAYS STATE COLLEGE

Dr. CUNNINGHAM. Congressman Hope, and members of the committee, I think every witness should make a contribution. I shall contribute by making my talk the shortest. I have a prepared statement which I should like permission to put into the record, and that statement sets forth the position of the Fort Hays Kansas State College.

(The statement referred to above is as follows:)

FLOOD DAMAGE TO FORT HAYS KANSAS STATE COLLEGE, HAYS, KANS.

(Data compiled October 26, 1951)

General information

Name: Fort Hays Kansas State College.
Address: Hays, Kans.
Total area: 4,000 acres.
Campus area: 50 acres.
Buildings: 12 major buildings, 47 residential, farm, and utility buildings.
Established 1902.

A. Location of areas where damages occurred

1. Practically entire academic campus including all major buildings flooded.
2. Custer Hall, women's housing area in the bend on the south and west sides of Big Creek.
3. Entire Lewis Field men's and married students' housing area and football stadium.

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4. College farm buildings, including dairy and other barns, farm shop and two farm residences.

5. Farm and campus lands in flood plane on both sides of Big Creek.

B. Frequency of flooding

We are told that this area was flooded in 1903 and again in 1907. In 1928 there was a destructive flood causing damage in major buildings and in 1951 there were two destructive floods in May and in June of this year.

C. Nature of damage caused by floods

1. Damage due to flooding of portions of 12 major academic buildings, including college power plant and dormitories; to 18 residential buildings containing 80 apartments; to 13 farm and utility buildings; and loss of, and damage to, the furnishings and equipment therein. Included in the above buildings which were flooded are the college cafeteria and storage basement, the college museum, portions of college library stack room, departments of chemistry, physics, history, men's physical education, women's physical education, printing and publicity, business and economics, speech and dramatics, photography and visual education, foreign languages, and industrial arts. Also the college power plant and entire underground heating system, greenhouse, storage rooms for janitorial, office, and academic supplies, the basement of Custer Hall, dormitory for women, and the boiler room of Residence Hall, dormitory for men, four irrigation pumping stations, and the college dairy and other farm buildings. Flood damage necessitated the replacement of two gymnasium floors and many wood and linoleum floors in classrooms and offices. Most of the equipment and furnishings damaged by the flood had to be replaced. Much painting, plastering, and carpentry was required in the basement rooms of all buildings. The heat tunnel required extensive repair, and the entire campus electrical system was so badly damaged that it will have to be replaced. Settlement and cracking have been noticed in three major buildings, the total replacement value of which would be $1,500,000. In addition, another major academic building is recommended for razing and replacement by the State architect. However, all buildings are still in use.

2. The college commencement exercises and final examinations of the 1950–51 year were canceled. During the summer session of 1951 many classes were relocated on a temporary basis in other undamaged college rooms and in the local public schools. Only 4 days of college were actually lost in the spring semester of 1951.

3. Students in some 80 apartments and 15 dormitory rooms suffered loss and damage to personal property, totaling $55,000. Faculty suffered considerable damage to real and personal property amounting to more than $45,000.

4. One bridge was damaged.

5. College and farm drives were damaged through settlement in several places, and loss of surfacing material in many places.

6. Erosive damage to creek banks in 12 places totaling 3,125 feet. Damage was particularly bad around four irrigation pumping pits and one bridge abutment.

7. Damage and inconvenience experienced due to silt deposit on six tennis courts, one cinder track, four athletic fields, 2 miles of roads and drives.

D. Amounts of damage suffered in each flood

1. May and June 1951 floods:	
(a). Buildings and contents	$292,896
(b). Personal property loss of students and faculty estimated	100,000
2. 1928 flood: No definite figures available, estimate	75,000

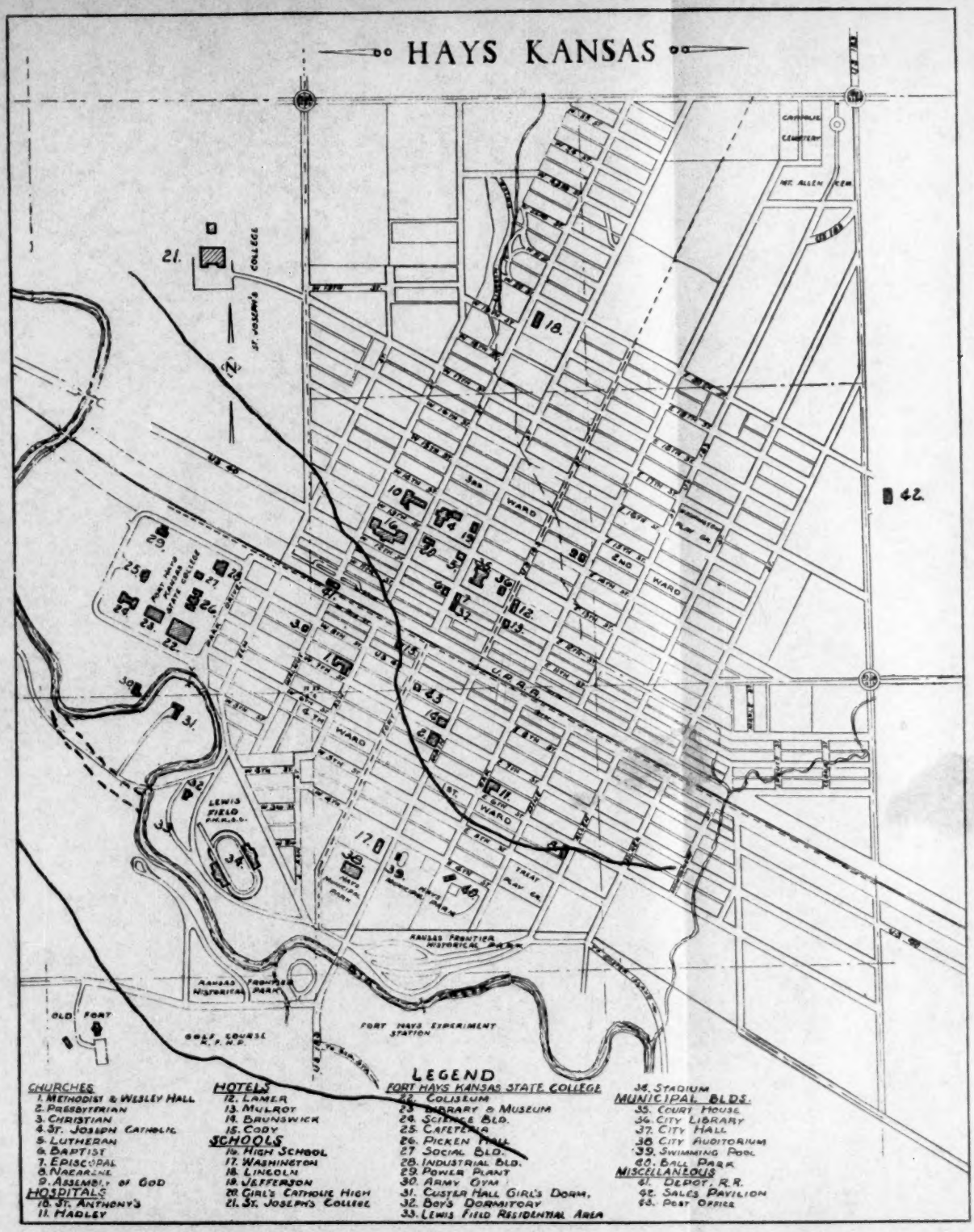
E. Effect of floods on public health or security of residents in or adjacent to flood plane

1. No health problems developed from floods so far as is known. Typhoid inoculations were given.

2. 1951 floods caused approximately 200 students and teachers to leave their rooms and apartments for various periods of time up to 3 months.

F. Description and location of any works already constructed or which have been proposed by local people, for flood control

1. A number of years ago the college constructed a small bypass overflow channel around the south and west sides of the Custer Hall area, which is in no way adequate. It is probably one-eighth the size necessary for handling of high water to protect the dormitory. See map attached.



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2. The college and city are cooperating in extensive removal of trees and brush from the channel of Big Creek after 1951 floods.

3. The college and city plan some diking of low spots on the north and east banks of the creek.

G. Description of protective measures which are considered desirable by local interests

1. The college considers not only desirable but essential the construction of a high-water bypass channel change for the high-water flow of Big Creek, approximately along the route of the existing small overflow channel around the south and west sides of the Custer Hall women's housing area to protect the women's dormitory from future floods. The earth from the cut to be used for fills across the present channel at the upper and lower ends with floodgates to control the flow through the existing channel to the normal low-water flow of the creek. One fill at least to serve as a roadway and replacement for the existing low-water bridge. Diking the north and east banks of this bypass channel and also of the creek from the railroad bridge a sufficient distance downstream to adequately protect against future flooding.

2. Increasing the waterway area under the Union Pacific Railroad bridge west of Hays.

Dr. CUNNINGHAM. I would like to inject one thought into the hearing. We at the college are interested in flood prevention and flood control from two aspects: First, every time we have a flood in western Kansas, it takes away the educational opportunity of children in that area; second, having our campus flooded twice within a month, we are interested in flood control and flood prevention from that angle, and we will appreciate any consideration.

Mr. HOPE. Are there any questions?

Thank you very much Dr. Cunningham for your statement and we will be glad to give it consideration.

The next witness is Mr. Embert Coles, from Colby, Kans., superintendent of the Colby Branch Experiment Station. Mr. Coles.

STATEMENT OF EMBERT COLES, SUPERINTENDENT, COLBY BRANCH EXPERIMENT STATION

Mr. COLES. Mr. Chairman, members of the committee, and ladies and gentlemen, I come with no prepared statement. Because when I was asked to appear before this commission or committee, I thought you were going to ask the questions as usually is the case when you have a witness. [Laughter.]

I would like to say it may seem odd that we are considering moisture, soil conservation, and flood control, in an area that receives as little rainfall as we do here in western Kansas. However, for your benefit I would like to picture to you how that rainfall usually comes. We cannot say always, because nothing ever happens regularly in western Kansas.

We receive 18½ inches, approximately, a year in this area. Seventy-six percent of that 18 inches falls between the 1st of April and the 1st of October. That is at the time we are doing some of our summer fallowing. I would like to correct the statement, or at least my impression. This is about the business of summer fallowing. We don't want you to take back to Washington the idea we are condemning this practice of summer fallowing, of not only wheat but all the crops, because we think it is worth while. That 76 percent of moisture that we receive from April to October, quite a portion of that falls in the form of torrential rains. We do not have in this area what is normally

known as those 3 or 4 days of gentle-falling rains, but whatever kind of weather we have, we have a lot of it and fast. Our rains come that way. That means we need to have a reservoir, one which has not been mentioned a lot. Our natural reservoir, that of the soil taking care of the water, can be improved upon. This means more soil conservation.

The soil-conservation survey is doing an excellent job with the tools they have to work with. However, back of those practices, in our estimation, should be some kind of fundamental research. We know something about moisture conservation in the high places, but I believe a research has not yet given us the final analysis. I won't recommend to the committee that we wait for the results of that research before we start furthering soil conservation. However, I do believe we should in the background, have some fundamental research on which to base the practice. We had a little bit in Mr. Aicher's testimony here this morning. The question of why that research was discontinued in 1937 or 1938. He only gave you 6 or 7 years. How much more valuable that information would have been if it had been from 1931 to 1951.

We do suggest basic research as part of the moisture-conservation program. We go right along with Paul Griffith and others on the matter of education. We have dealt with the farmers of western Kansas for the past 30 years or so and we find this. You can make a recommendation but how do you know it will increase the yield—and you had better have proof. These farmers are rather inclined to want proof that this will hold true if they follow it on their farms.

So, in the matter of moisture conservation and flood control, let us not overlook the vast reservoir we have in the soil. We know the whole prosperity of this area depends largely on the amount of moisture we get into the soil.

My statement has been a little longer than Dr. Cunningham's. Thank you for the opportunity of being invited to be here today.

Mr. HOPE. Are there any questions? We want to thank you Mr. Coles. We have certainly enjoyed your statement.

Mr. Russell Anderson, representing the Decatur County farmers, is our next speaker. Mr. Anderson.

STATEMENT OF RUSSELL ANDERSON, DECATUR COUNTY, KANS.

Mr. ANDERSON. Mr. Chairman and honorable Members of Congress, I represent quite a large number of upland farmers and farmers along the Beaver Valley in Decatur County, Kans., which is 60 or 70 miles over northeast. This land along the Beaver Creek is one of the richest lands in the State of Kansas. Our crops last summer were ruined by floods, which caused discussion on ways and means of averting the tragedy in the future.

One conclusion was reached: We need to dam the draws and canyons to help terraces hold the water where it falls. Now, the Beaver watershed is about 100 miles of canyons and big draws from over in our territory to its beginning out on the edge of Colorado.

Decatur County has about 25 percent of their land terraced, which I think is one of the foremost in the State. In order to show you how effective it is, let me point out that one man has 900 acres, 650 acres are terraced, with about 30 miles of terraces. He claims there

is about 50-percent stoppage of water, even in the heaviest rains. He has never touched his fences in 3 years on the lower side of his farm. However, there is some water runoff and that is our idea of stopping this water in the large canyons rather than allowing it to go on and do the damage below which it has.

If this was done, it would save all the bridges, fences, crops, and the land itself that are now destroyed by allowing the water to accumulate from draw to canyon until we have a roaring flood.

The Bureau of Reclamation is studying the proposition of a 650-foot dam, 6 miles east of us, right down by Cedar Bluffs, that is going to cost around $5,000,000. This dam is fine but keep in mind all the destruction that this water has done traveling the 100 miles from Colorado down to this dam. We think one-fourth of this money, or $1,250,000, should be spent on these communities and individuals that have been injured in the past.

A contractor, or rather an engineer, who specializes on dams, has estimated that $10,000 will put in a dam large enough to hold back in certain places some 250 acre-feet, and control the run-off from around 6,000 acres. In other words, this would be a dam about 28 feet high, with the first spillway at 15½ feet, and the rest of it would be for emergency flood control, and the water would be let out at a controlled rate. This would cover approximately 50 acres of land. In some canyons the dam would not be this large, and in a half dozen, they might need two or three.

At the present, we have Government agencies that can help with two sizes of dams; one for your stockwater ponds and the big Bureau of Reclamation dams. However, we don't have any Government agency or department that will help with the type of dam that we are talking about. The farmer cannot afford it himself.

Mr. HOPE. Are there any questions? Thank you Mr. Anderson for your contribution.

Our next witness is Mr. George Hetzel, of the Kinsley, Kans., Chamber of Commerce. Mr. Hetzel.

STATEMENT OF GEORGE HETZEL, KINSLEY CHAMBER OF COMMERCE

Mr. HETZEL. Mr. Chairman, committee, and neighbors, I just want to say a few words; but, before I do, I would like to go on the stage and turn back the calendar, not of time—God knows time has gotten ahead of us now [goes on stage and turns map over]—I am doing this because I haven't heard a word said about this land which is below the Missouri watershed. There are men here today who were with me in Kansas City last July. Some of your committee was there, I believe. I am not sure, because there were so many of us there, and it was lucky we got anything done.

The CHAIRMAN. May I say that some of the members of the committee were in Oklahoma in the Ouachita Valley, which is south of what you are pointing out.

Mr. HETZEL. We have an association, and I would like to leave with the committee, if they think it would be of any advantage, our bylaws, our resolutions, and objectives of the committee set-up in Kansas City a short time ago, which is to be organized. We are expecting to call

on you fellows in Washington and the proper agencies to get the things done which we have in mind.

(The matter referred to above is as follows:)

CONSTITUTION AND BYLAWS OF THE MISSOURI-ARKANSAS BASINS FLOOD-CONTROL ASSOCIATION

CONSTITUTION

ARTICLE I. NAME

The name of this organization shall be "Missouri-Arkansas Basins Flood-Control Association."

ARTICLE II. OBJECTIVES

The primary objectives of this association are—

1. To assure the earliest possible completion of the authorized and coordinated and comprehensive flood-control plan, the authorization of officially recommended plans with such additions as time and experience show are justified.

2. To seek sound comprehensive flood-control programs on other tributaries of the Missouri River and on the Arkansas River and its tributaries in Kansas.

3. To support and recommend a sound program of conservation of the land and water resources within the association's area when such support will not interfere with the speedy and economic progress of flood protection.

4. To procure and disseminate to the public accurate and trustworthy information concerning the construction and engineering requirements both in respect to levees, reservoirs, and other works incident to the provision of adequate flood protection within said area.

5. To sponsor and promote effective cooperation with agricultural, commercial, industrial, and other interests in the solution of the problems of flood damage and control, including cooperation to that end with all interested local, city, county, public, and civic organizations for the purpose of presenting a united front before legislative bodies.

ARTICLE III. MEMBERSHIP

This association shall be composed of the accredited representatives of the recognized flood-control associations.

SECTION 1. *Eligibility.*—Associations subscribing to the constitution and acceptable to the executive board may become members and shall be permitted to name members to the executive board in accordance with the bylaws.

SEC. 2. *Duration.*—Membership shall endure for such time as the associated members abide by the constitution and bylaws.

SEC. 3. *Allocation of contributions of members.*—Allocation of contribution shall be fixed and determined by the executive board.

SEC. 4. *Contributions.*—The association may receive contributions in money or property for the attainment of the objectives of the association, at any time from any donor, member, or otherwise.

ARTICLE IV. OFFICERS AND COMMITTEES

SECTION 1. *Officers.*—The officers of the association shall consist of a president, vice president, secretary-treasurer, who shall be elected annually by the members of the executive board.

SEC. 2. *Committees.*—The president, with the approval of the executive board, may establish such standing or special committee as may be necessary and appoint the chairman and members thereof.

ARTICLE V. BYLAWS

SECTION 1. The executive board shall have the right to draw such bylaws as they deem necessary for their government. These bylaws may be amended at any regularly called meeting of the board by two-thirds majority vote of those present.

ARTICLE VI. AMENDMENTS

This constitution may be amended at any regular or special meeting of the members of the executive board, a quorum being present by a three-fourths vote of all members present, provided that such proposed amendment on the date of

the meeting shall be mailed to all members of the executive board of this association at least 10 days prior to the date of the meeting. Voting by proxy is hereby prohibited.

BYLAWS

ARTICLE I. MEMBERSHIP

Any duly organized association subscribing to the constitution of this association shall be entitled to membership in this association irrespective of whether said organization is in the districts already formed or districts hereinafter referred to. The primary structure of this association consists of 22 districts described as follows:

District No. 1: Missouri River and adjacent tributaries from Yankton, S. Dak., to Sioux City, Iowa.

District No. 2: Missouri River and adjacent tributaries from Sioux City, Iowa, to Omaha, Nebr.

District No. 3: Missouri River and adjacent tributaries from Omaha, Nebr., to Rulo, Nebr.

District No. 4: Missouri River and adjacent tributaries from Rulo, Nebr., to Kansas City, Mo.

District No. 5: Missouri River and adjacent tributaries from Kansas City, Mo., to Brunswick, Mo.

District No. 6: Missouri River and adjacent tributaries from Brunswick, Mo., to mouth of Osage River.

District No. 7: Missouri River and adjacent tributaries from mouth of Osage River to St. Louis, Mo.

District No. 8: Osage River Basin.

District No. 9: North Grand River Basin.

District No. 10: Blackwater-Lamine River Basin.

District No. 11: The Kansas River and its tributaries except the Delaware River from Kansas City to Graniteville.

District No. 12: The Kansas River and its tributaries except the Blue and Republican Rivers—Topeka to Junction City, Kans.

District No. 13: The Delaware River.

District No. 14: The Blue River and tributaries.

District No. 15: The Republican River and tributaries.

District No. 16: The Solomon River and tributaries.

District No. 17: The Saline River and tributaries.

District No. 18: The Smoky Hill River and tributaries.

District No. 19: The Marais des Cygnes River and tributaries.

Districts 20, 21, and 22: The Arkansas River Valley and tributaries in Kansas.

The primary districts herein incorporated shall each be entitled to two representatives on the executive board, except districts No. 11 to No. 22, inclusive, which shall have one member each on the executive board. The representatives to the executive board of this association shall be those duly elected by their own organization, providing that such associations have qualified for membership in accordance with the provisions of this association's constitution.

The executive board at any annual or special meeting hereinafter may designate and create such additional districts from time to time. Each district so designated and created shall be entitled to one representative on the executive board.

ARTICLE II. OFFICERS

The officers of the association shall consist of president and vice presidents, who shall be duly qualified members of the executive board; the secretary and treasurer may be either members or nonmembers of the executive board.

President

SECTION 1. The president shall be elected at the annual meeting and shall hold office for a term of 1 year or until his successor is duly elected and qualified. The duties of the president shall be to preside at all meetings. He shall be the chief officer of the association and it shall be his duty to see that the actions and directions of the executive board are carried out.

Vice Presidents

SEC. 2. The vice presidents shall be elected at the annual meeting and shall hold office for a term of 1 year or until their successors are duly elected and qualified. The duties of the vice president shall be to act in the absence of the president, and he shall be vested with all the powers of the president hereinabove set forth, in the event the president for any reason be unable to act.

Secretary

SEC. 3. The secretary shall be elected at the annual meeting and shall hold office for a term of 1 year or until his successor is duly elected and qualified. The duties of the secretary shall be to keep all of the minutes and records of the association, to receive and transmit all correspondence on behalf of the association, to send notices of meetings, and to generally maintain the records of the association.

Upon the election of a successor the secretary shall transmit to his successor all records and files in his hands belonging to the association.

Treasurer

SEC. 4. The treasurer shall be elected at the annual meeting and shall hold office for a term of 1 year or until his successor is duly elected and qualified. The duties of the treasurer shall be to receive all funds coming into the association from any source, to keep a record thereof, and to pay out funds authorized by the executive board and under direction of the president.

SEC. 5. The executive board may at any annual meeting combine the office of secretary and treasurer.

ARTICLE III. MEETINGS

SECTION 1. The annual meeting shall be held on the second Friday of September in each year. In addition thereto, special meetings shall be held from time to time as directed by the president, or upon the call of any five or more duly qualified members of the executive board.

SEC. 2. Notices of all meetings shall be given in writing addressed to each of the members of the executive board and placed in the mail at least 10 days prior to the date of said meeting, which notice shall specify the time and place of the meeting.

SEC. 3. The annual meeting and any special call meeting of the executive board shall be held in Kansas City, Mo., unless otherwise previously determined by the executive board.

ARTICLE IV. QUORUM

That one-third of the members of the executive board in good standing shall be required for a quorum at any regular or special meeting.

ARTICLE V. COMMITTEES

By and with the approval of the executive board the president shall appoint such standing committees and designate their duties as from time to time may be properly necessary in carrying out the action and direction of said executive board. Said standing committee shall continue to act during the term of the president unless sooner discharged. No standing committee shall have authority to commit the association, its executive board, or its officers beyond the expressed authority granted said committee.

ARTICLE VI. MEMBERSHIP DUES

The annual dues for membership in this association shall be $100 for each district having one member on the executive board, and $150 for each district having two members on the executive board.

The fiscal year shall be from September 1 to August 31, and the dues shall be due and payable on or before August 1 preceding to qualify members.

For the first year the dues shall be due and payable on or before November 1, 1951

ARTICLE VII. PARLIAMENTARY AUTHORITY

Robert's Rules of Order shall regulate the conduct of all meetings.

RESOLUTIONS of the MISSOURI-ARKANSAS BASINS FLOOD-CONTROL ASSOCIATION

Adopted at the Kansas City meeting of September 21 and 22, 1951

Whereas no nation in the world is rich enough to afford the flood loss in human life and property suffered in 1951 in the Missouri-Arkansas River Basins; and

Whereas we, the resolutions committee of the Missouri-Arkansas Basins Flood-Control Association, duly organized and formed in Kansas City, Mo., on Friday, September 21, 1951, firmly believe that the tragedy of the floods of 1951 must never be repeated: Now, therefore, in order to prevent a recurrence of the flood catastrophe, be it

Resolved, (1) That the people of the Missouri-Arkansas River Basins have joined together in this organization to resolve their respective localized problems and to present a united front before legislative bodies; be it further

Resolved, (2) That the people of the Missouri-Arkansas River Basins demand Federal appropriations to carry out the orderly and prompt completion of the authorized and recommended, coordinated, and comprehensive flood-control plans. It is further recommended that immediate appropriations should include funds sufficient to (i) start construction of the Tuttle Creek Reservoir; (ii) start construction of Gavins Point Dam; (iii) assure the continuance of work on the Oahe Dam and all other dams now under construction; and (iv) insure immediate inauguration of work on dams not under construction, which include important flood-control features. It is further

Resolved, (3) That adequate funds should be made available annually to the Corps of Army Engineers for surveys and planning on authorized projects and flood-hazard streams in the Missouri and Arkansas Basins, as such surveys furnish necessary information for intelligent action. It is further

Resolved, (4) That there should be an immediate start on the authorized flood-control projects in the Missouri and Arkansas River Basins.

Resolved, (5) That authorization of all recommended flood-control projects not already authorized be forthcoming immediately, so all projects in the Missouri and Arkansas River Basins will be in readiness for appropriations and construction.

Resolved, (6) That the recommendations of the Governor of Missouri and of the department of resources and development, with coordinating agencies as shown by their survey, respecting the Kaysinger Dam on the Osage River, be given further consideration.

Resolved, (7) That the people of the Missouri and Arkansas River Basins hereby commend the great work being done by the soil-conservation districts, the State extension service, and the work by the Soil Conservation Service of the United States Department of Agriculture. We believe that this work is a very worthy and necessary soil-management practice, and is supplemental to but not a substitute for flood-control reservoirs and levees.

Resolved, (8) That we believe that the management of the leased land in the reservoir and flood-plane area owned by the Government should be in accordance with recommendations made by the Soil Conservation Service and should be carried out under its supervision.

Resolved, (9) That the Senate of the United States be commended for approving appropriations for authorized flood-control projects for Tuttle Creek Dam, Toronto Dam, Strawn Dam, and Wichita and Hutchinson, Kans., protective works, and that the House of Representatives should concur in these appropriations.

Resolved, (10) That appropriations be authorized for the continued construction and completion of agricultural levees and that previously authorized funds be immediately released in order to expedite construction of agricultural levees.

Resolved, (11) That the people of the Missouri and Arkansas River Basins sincerely thank the flood-control committee of the Kansas City (Mo.) Chamber of Commerce for their cooperation and for making facilities available for this meeting.

Mr. HETZEL. You come down here [pointing to chart] and take in the Missouri River Basin, which, of course, includes the Kaw; then it comes down here and takes in the Arkansas, which starts over here

in Colorado and comes on down below here and on down into Oklahoma, and on down to the Mississippi here. These two States, Kansas and Oklahoma, are affected by the area we have been discussing today—it is one drainage area. Our organization was formed by people from this Arkansas and Missouri Valley River Basins, with directors reaching clear up to Yankton, S. Dak.

Now, soil conservation came pretty near to upsetting that meeting in Kansas City when we were just where we could all work together, and it was a real fight to get the power boys off our necks for a minute in order to get the soil-conservation boys to belong with the idea of flood prevention.

Mr. HOPE. When you refer to the "soil-conservation boys," who are you talking about?

Mr. HETZEL. We had the soil-conservation boys there and were glad to have them show up, but it was the Blue Valley Study Club that almost murdered the Kaw River boys. [Laughter.]

Mr. HOPE. We are going down to Topeka tomorrow and I expect they will be there. Glad you warned us. [Laughter.] But you aren't talking about the Soil Conservation Service when you are talking about the soil-conservation boys, are you?

Mr. HETZEL. No, sir. After staying up 2 days and almost all night and taking the battle from all sides, we finally got the Kaw River boys to come along and realize that we must have soil conservation and we must have our dams, our stock ponds, and also this two-way dam we have been talking about—the kind where we can hold back some water but also have a place to store the water when the flood comes.

Now, Mr. Poage has brought out several times this same idea in order to get us to agree on it, and that is the kind of dam they want over this area.

In my particular county on the Arkansas River, we have suffered tremendously from our little old dry creek, and Mr. Hope can appreciate this very much. We had about $480,000 loss in our county just this year from one little, measly flood, and one in which the river wasn't even involved.

Mr. HOPE. That was Coon Creek.

Mr. HETZEL. Yes. I am very happy to say that we are taking upon ourselves to circulate a petition, and in a few days we will have enough signers to go ahead with this and have the Army engineers work these rivers together. We must learn that in our soil conservation, flood control, water erosion—that we must all work together. That is what we finally accomplished at Kansas City. We finally got those three river groups together and we are now going to work together, and you will hear from us down in Washington. I hope you won't throw us out. We have men in the organization who have forgotten more about these problems than I will ever know, and they will still endorse the same thing that I have learned from sitting through 24 floods—16 of them being on my home place. They all agreed that we want soil conservation, water conservation, small dams and big dams, and, at the end, a plan to hold the soil and water back where they both belong.

However, we have to have the big dams, and fellows, we are depending on you folks for the appropriations. We are following the Corps of Army Engineer plans, so that when we get our plans worked out, that they will fit into the over-all plan of the rivers. We want

to be sure that you are familiar with the over-all basic situation concerning flood control, which, of course, is a misnomer, because flood prevention is what we want.

I want to thank you and this crowd; the men who have participated and the men who have brought their ideas here from our different departments of State. They all made good common sense and no horseplay. I appreciate it a lot.

Mr. HOPE. I am sure the committee appreciated your statement, Mr. Hetzel. I might say I am aware of our organization—of your group—through reading about it in the newspapers. The committee is glad to have the information which you have submitted with respect to your organization.

I presume you are aware of the survey being made by the Army engineers and other agencies on the Arkansas, as well as the White and Red Rivers, following which when the work is all done, the agencies will join in a report to the Federal Government, but it will be 2 years before that report is submitted. We hope that when it is submitted that it will be a report in which there is agreement between the different agencies, a program which embraces soil conservation, water conservation, and flood and water control.

Mr. HETZEL. That is where we are going along with you. We have got our Corps of Engineers from Albuquerque and have the plan down as far as Great Bend, and we are working on down. That is what we are doing our work under. However, we don't have the $350,000. But even so, we will do it the hard way and pay for it out of our pockets. As you say, it will take a couple of years to go ahead.

We are just getting organized, so we will probably be calling on you in the future, and hope to come in, not with a lopsided plan, but with soil conservation, water conservation, and at the end, flood prevention if we can prevent it, if not, flood control.

Mr. HOPE. Thank you very much Mr. Hetzel for your statements.

Our next witness is Mr. Herman Praeger, representing the Kansas Farm Bureau of Claflin, Kans. Mr. Praeger.

STATEMENT OF HERMAN PRAEGER, KANSAS FARM BUREAU, CLAFLIN, KANS.

Mr. PRAEGER. Congressman Hope and honorable members of the committee, and ladies and gentlemen, my name is Herman Praeger and I am a farmer from Barton County in the central part of the State, actively engaged in farming, and also have the honor of being president of the Kansas Farm Bureau.

The Kansas Farm Bureau, as I think most of you know, is an affiliation of 105 county farm bureau associations into the State organization, which has a membership at the present time of 58,000 farm families. In my own farm operations at home, which is operated in partnership with two sons, we have long considered the agencies of the Department of Agriculture as very valuable adjuncts to the farmer in helping to make his farm more profitable.

We have worked with the Extension ever since its beginning. We have worked with the soil conservation. We have worked with the PMA. All three agencies are vital and very important to this very

thing we have been discussing here, which is the conservation of the water where it falls and saving of the soil from washing down into the streams.

Now, I am sure that all Kansas farmers agree with you on that point. I have heard a lot of good testimony here about the flood business and this tributary thing that runs into the main streams, that causes the floods.

Our home office is located at Manhattan. I had the opportunity of flying over the flood scenes two or three times when it was at its peak. I have seen some of the creeks come in which were larger than the original stream normally is, and they were every few miles coming in. And, when all that accumulates, you are bound to have a terrible flood.

Now, we know terracing is the thing to do. We know the waterways should be seeded to grass and the land that has been broken shouldn't be broken, it should be reseeded to grass. The terraces make running waters walk. We need farm ponds, but we need a lot of detention dams. And, what some of these gentlemen have testified to on these tributaries is exactly what we must have more of, in order to keep them from coming into the main stream.

Now, I want to read to you the resolution that was adopted at the thirty-third annual meeting of the Kansas Farm Bureau delegates, assembled at Wichita last week, relative to flood control or flood prevention. I think most of you will heartily agree with these resolutions, because it is a sensible program worked out by 450 delegates, who represented the 58,000 farm families at Wichita, covering the entire State. In this area you have severe floods from minor streams and in eastern Kansas they are really torrents of water.

(The resolution referred to above is as follows:)

KANSAS FARM BUREAU RESOLUTIONS

ADOPTED BY VOTING DELEGATES OCTOBER 26, 1951, WICHITA, KANS.

FLOOD CONTROL OR FLOOD PREVENTION

We see no reason to reverse our basic position of other years that a policy of holding water where it falls is sound flood control procedure and in the best interest of our State's economy.

We do not object to big dams and reservoirs as such when there is complete assurance that they are properly integrated in a complete water resources program. But we do object to full reliance on big dams as a complete flood-control program, or even as the primary factor in a flood-control program. We maintain that the approach to the problem of flood control by big dam advocates, placing primary emphasis on huge main stem structures, is contrary to the basic philosophy in the report of the President's Water Resources Policy Commission, to the recommendations to the Hoover Commission, to a fair application of the interagency principle and to the best interest of our entire economy.

The big dam approach to the flood-control problem gives little consideration to losses and damage above dam sites which in several instances of recent years have been greater than losses and damage below dam sites. Furthermore, stream flow data, rainfall data, and data on the time of crest readings at official observation points will show conclusively that dams proposed under the Pick-Sloan plan would have done little to reduce damage at numerous points in Kansas in July 1951, notable at Manhattan and Topeka. Furthermore, the floods of 1951 demonstrated that the operation of multiple-purpose dams leaves much to be desired in a true flood-control program.

We would point out that big dam advocates aroused suspicion on the justification for their proposals when they resorted to false and extravagant claims during the hysteria attending the July floods. We refer particularly to false reports on Smoky Hill River conditions, to misleading stream flow reports, and to unrealistic cost-benefit figures.

We will support a thoroughly integrated over-all program for flood control. We are convinced that detention dams which do not inundate large areas of fertile farmland should play an important part in such a program. But we do not believe that any single agency or any combination of two agencies arranging a compromise between themselves should be permitted to take recommendations directly to the Congress. The interests of our economy must be protected by an over-all supervisory screening authority or commission, disassociated from any single agency, to assure that flood-control projects by individual agencies will fit into an integrated program.

The problem needs the full cooperation of all concerned. We pledge our full support to speedy advancement of an integrated flood-control program. Immediate and positive steps should be taken to provide funds and technical assistance for the construction of detention dams and other practices designed to hold water where it falls, and to halt tributary inflow, the major factor in the July floods. Large dams, authorized in years past on the sole consideration of main stem control, should be resurveyed, taking into consideration reduced tributary inflow as a result of a detention dam and land treatment program.

I want to take this opportunity of thanking you gentlemen for the chance to testify.

Mr. HOPE. I take it from what you say, Mr. Praeger, that it would be your position that, as far as the Pick-Sloan plan is concerned, there should be a restudy and a resurvey of that plan and the projects under it, which would take into consideration the use of the small detention dams and the treatment of the soil as part of the over-all flood-control program; is that correct?

Mr. PRAEGER. That is correct, Congressman. And, another thing. Our delegates at the meeting were concerned with the estimates. You know the figures on the large dams are getting a little old, especially with inflation coming along, and if you authorize the building of a dam that has been figured 10 years ago, you may run out of funds before you get it halfway completed. They would like to see some of the money that goes into the big dams be used in tributary detention dams to help hold the water back before it gets into the main streams.

Mr. HOPE. In other words, you feel there should be a complete restudy of the program, taking into consideration what we call the Missouri River Basin agriculture program, before we go ahead too far with the entire Missouri Valley program?

Mr. PRAEGER. That is correct, Congressman. That is the position we take.

Mr. HOPE. You are not opposed to a proper division of funds or a proper apportionment of the work between the various types of activities, ranging all the way from the big dams to the soil treatment, but you want the study to be made and the program to be carried out with proper weight being given to the various types of flood-control and flood-prevention activities; is that right?

Mr. PRAEGER. That is right. You realize just the big dams alone will never do the job, in my opinion, and also in the opinions of a lot of delegates down there. But if we get the whole watershed under good soil-conservation practices and get a lot of detention dams built and also a lot of farm ponds, you will be able to hold the crest back long enough so the main streams will get halfway empty before you let the retention dams flow out, and in that way avert a lot of damage below and at the same time do a lot of good to the uplands in the western part of Kansas, as well as the other States interested in this program.

The CHAIRMAN. I think you brought out very forcibly one of the difficulties in dealing with the Government programs. Certainly, nobody could question your suggestion that we ought not go on and spend in the neighborhood of a billion dollars of money, maybe 2 billion, or maybe something less, but in astronomical figures, the money to carry out the Pick-Sloan plan without reappraisement, to know where we are going and what we are going to do, and what we will have accomplished when we get through. At the same time, if we say we aren't going to proceed without the survey we might sit around and wait for more floods.

Mr. PRAEGER. It has been brought out that we have the soil-conservation program, the educational program, and the PMA. We can do something to encourage more terracing, more practical rotation of crops, which the soil conservation recommends. And then maybe we can get greater payments.

The suggestion you made about the farm ponds of being of benefit to the farmer is correct, but if he is going to build a retention dam that will cost more than the pond, he ought to have some assistance from the public. If we can get some of those things accomplished in the meantime, we will be better able to head off some of this water.

The CHAIRMAN. I am wondering if we can't go a step further and authorize some extensive work in the smaller drainage basins which are deemed the most critical? There appears to be areas in this section which are more important from the flood prevention standpoint than others. This committee may not be able to expedite this matter through Congress, but it can make recommendation to Congress of selecting certain valleys that seem to be the most critical in the United States, to carry on the upstream work in an accelerated manner at once without waiting for the entire plan. I don't believe this entire valley is so tremendously extensive that it involves the venue of the entire Nation, but the Missouri Valley Basin does. It involves something which we ought to do a lot of studying on.

Might we not compromise and say we will start some of the smaller projects throughout the United States?

Mr. PRAEGER. Certainly, that is the approach the members of our organization desire. We have started one west of Salina, where one small group went together and created a drainage district. They claim they have had good results, even during the flood period.

The CHAIRMAN. Of all the agricultural flood prevention projects in the United States, the Ouachita Valley in Oklahoma, has probably proceeded further than any one valley. They are not complete but they do have enough structures in there that they think they're able at least to influence their floods, so as to minimize damage. And, if we made similar starts over the country, it seems to me we would pretty quickly determine whether this program is applicable as most of us think it is, and if it isn't going to work, we won't have suffered a great loss in expenditures as we would on the larger dams.

Mr. PRAEGER. Do they have detention dams in the Ouachita drainage basin?

The CHAIRMAN. Yes. They have put in a check dam where the water simply runs through. It never impounds the water because the water that comes into it runs out all the time. However, there are others where they enclose the reservoir and impound the water, hold-

ing it until the main stream is cleared of water, and then sending this water on down to the main stream.

Mr. PRAEGER. I am sure that is along the line of thinking that the delegates had in mind. We ought to use more Federal money to encourage the building of detention type dams, which will help a lot in floods, and at the same time leave a little water in the reservoir for watering ponds. However, the main purpose of this type of dam, is to hold back the water and let it out when the main stream has cleared.

The CHAIRMAN. Normally, they expect the farmer to give the land for the reservoir. In return, he gets the benefit of the pond. And, they do leave water in all the ponds. So, he does get a substantial benefit from it and the Government pays the cost of the structure.

Mr. HOPE. In that connection, I don't recall these figures, and I may be wrong about this. But, as I recall our conversation with the representative of the Soil Conservation Service at the Washita project, he said that if the appropriations were limited to the present rate, it would take a hundred years to finish the entire basin.

The CHAIRMAN. That is right.

Mr. HOPE. We might be learning something during that time. We all realize that the entire flood-control program throughout the United States will take a number of years to carry out. But, do you think it might be better to go ahead with the projects like the Washita, where the plans are all drawn as far as the soil conservation is concerned, or nearly enough drawn so they can go ahead and work much faster than they are and complete the work, then we will have a practical demonstration of what can be done or what can't be done? We will learn something by carrying out the work on one project that has been started, rather than have this thing drag on for years and years, and not having a full demonstration of what can be done under that sort of program. What do you think would be the best way in which to proceed?

Mr. PRAEGER. I think you should push the completion of the project as quickly as possible, which may take a number of years, but at the same time let's start on some little projects in this area.

Mr. HOPE. I am not suggesting that we go ahead with that to the exclusion of other projects, but simply that we take some money from the big dams perhaps, and divert it to a project like that and complete it. Then, we will know how much effect a project of that kind will have in lessening the needs for the big dams. And, until we do that, it will be entirely speculation. It seems to me there ought to be a few projects in the country which we can go ahead and complete, and thus settle the question.

Mr. PRAEGER. The delegates didn't want to eliminate the big dams entirely.

Mr. HOPE. No one wants to eliminate them entirely.

Mr. PRAEGER. We want them all working together to get the job done.

Mr. HOPE. Are there any further questions? Thank you very much Mr. Praeger for your contribution.

Mr. Milton Nitsch, of the Oberlin Chamber of Commerce, will be the next speaker, Mr. Nitsch.

STATEMENT OF MILTON NITSCH, OBERLIN CHAMBER OF COMMERCE

Mr. NITSCH. Mr. Chairman, honorable members of the committee, ladies and gentlemen, I come here before you today as president of the Oberlin Chamber of Commerce—not a pill-peddler. [Laughter.] I own an automobile and implement business. I am also a farmer in Decatur County.

As I understand it, there are two large dams proposed in Decatur County. One on the Sappa Creek southwest of Oberlin, and the other on the Beaver, north of Oberlin. We, the businessmen of Oberlin, do not feel that these dams are the solution to our problem in the way of flood control. We feel that more soil conservation will serve the purpose rather than the large dams, providing we can get the farmers to put in more ponds in their pastures.

You asked awhile ago if the farmers were willing to pay more taxes in order to get the dams built. I am just wondering if the taxes won't be just as much by putting in individual dams, as they would be by putting in the large dams, like the ones proposed in Decatur County?

I don't have a written report today. However, I have come before you fellows and I wish you would give Oberlin, Decatur County, and the farmers some consideration. We believe the Pick-Sloan plan should be gone over again, and we in Decatur County, do not feel that those two dams are the solution to our problem in Decatur County. More soil conservation and encouragement from the Government will do the job. That is all.

The CHAIRMAN. I would like to ask you the question of whether it won't be possible to secure the same amount of storage for possibly less money in the small reservoirs and put it in the large reservoirs? We have some figures which indicate that the small reservoirs in some instances can provide more storage than the large dams, but that of course must depend on the location of both the large dams and small ones. Certainly, the large reservoirs are more economical than the others. If you have a natural basin in which to build your reservoir, obviously, you can store water less an acre-foot than if you tried to put it out on the Canadian River down in Oklahoma, where there is no basin. And, the same thing is true with small reservoirs. It depends on your dam sites.

Mr. NITSCH. You can take the floods we had this year. If you had all the creeks dammed in western Kansas, it wouldn't have helped Manhattan out a bit.

The CHAIRMAN. Why?

Mr. NITSCH. They had 14 inches of rain in a short time. The amount of water that came down the Sappa and Beaver Creeks didn't add to their misery. We were having our rains at the same time.

The CHAIRMAN. If you had those creeks dammed wouldn't it have helped them?

Mr. NITSCH. No.

The CHAIRMAN. Why?

Mr. NITSCH. Because they had their rain at the same time we had ours.

The CHAIRMAN. Suppose they originally had 10 feet of water and then they received 5 more feet. Isn't it the top 5 feet of water that hurts the worst?

Mr. NITSCH. I believe you will find they had their rain before or at least the same time as we had ours in western Kansas.

The CHAIRMAN. If they had had local structures wouldn't that have helped the situation? I don't mean it would have stopped the flood. I don't mean to be misunderstood that you can stop all floods, because obviously, you can't stop all the floods, but if you can take part of the crest off, you help the situation.

Mr. NITSCH. They were flooded before the waters from this area got down there.

The CHAIRMAN. If they had had the same type of soil treatment that has been going on in this local area, wouldn't that have reduced the flood?

Mr. NITSCH. Yes. We went from July 1950 to April 1951 with less than an inch and a half of moisture at Oberlin, Kans. It is very unusual we get the amount of rain we had after that.

Mr. HOPE. Are there any further questions? Thank you very much, Mr. Nitsch.

Mr. Val Kuska, agent for the Burlington Railroad, will be our next witness. Mr. Kuska.

STATEMENT OF VAL KUSKA, AGRICULTURE AGENT, BURLINGTON RAILROAD

Mr. KUSKA. Mr. Chairman, members of the committee, and friends, I have a rather lengthy statement which I will not read. However, I would like to ask permission to file it.

Mr. HOPE. We will be glad to receive it.

(The report referred to is as follows:)

STATEMENT BY VAL KUSKA, AGRICULTURAL DEVELOPMENT AGENT, C., B. & Q. RAILROAD, OMAHA, NEBR., ON MISSOURI RIVER BASIN AGRICULTURAL PROGRAM

The Missouri River Basin covers 528,000 square miles of territory, roughly one-sixth of the entire land area of the United States. It has 5 percent of the population (6,867,000 in 1940, having lost 200,000 since 1930). Cropped acreage of 85,628,000 is 26 percent of United States total. Crop value of $547,577,000 is 18 percent of United States total (1940 census). Per acre return from crops averaged $7.56; dry land returns averaged less than $6 an acre; irrigated lands, $25 an acre.

Of the 85,628,000 acres in the basin, 5,120,000 acres were irrigated, as of 1940. Under Pick-Sloan plan for development 5,307,704 acres more can be irrigated, which would mean over 53,000 new farms with an agricultural population gain of 212,000, twice as many new urban residents, or a total population gain of 636,000.

This potential is particularly desirable for Nebraskans who stand to gain nearly 2 million irrigable acres and increase farm production by 25 percent. They remember the droughty 1930's when corn and wheat production (1930–40) was 1,100,000,000 bushels less than in decade 1920–30. During that time, too, the Government purchased livestock from 49,000 distressed farms (out of 114,000 total), and the State lost 62,000 population, of which only 10,000 was regained by 1950. Undoubtedly we shall experience drought again but with full development under Pick-Sloan and Young plans, we need not suffer similar losses.

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Increasing needs of our own growing population and world demands are a challenge to make this one-quarter of the total cropped area produce a proportionate share of food and fibers. With over 10 million acres irrigable and 75 million acres remaining as dry farm or nonirrigated, we have a resource that should be encouraged to reach that goal. We feel that research and investigation, and extension education to properly disseminate the findings, are the best means to that end.

Both dry land and irrigated regions have problems to be solved. Firm faith and hard work of several generations of settlers have disproved the judgment of early explorers and politicians who saw the Great Plains area as the Great American Desert. But ignorance or lack of understanding of conditions on the part of settlers and the makers of Federal homestead policy have delayed the maximum development we now think is possible. Previous farming experience of early settlers, if any, was in crop production which, incidentally, required less capital than a livestock type of farming. Also, homestead laws encouraged small farming units and crop production.

True, agricultural research carried on by Federal and State Governments in the past has been a very important aid in developing the Great Plains. Their study of soils and climate, their breeding of plants to withstand the exacting conditions of growing and harvesting crops here has undoubtedly pushed the frontier of assured crop production westward, even prevented failures and disappointments which the Indian, and some white men, apparently expected when, pointing to newly plowed sod, he grunted: "Ugh, wrong side up."

Continued and expending research is still needed for fuller development of the Great Plains and the Missouri Basin which occupies the northern part. And the work needs to be done right here where conditions are so different from other agricultural areas in the United States. Actually, variation within the region is great enough so that plants developed in one part cannot be successfully grown in another part unless all conditions of rainfall, altitude, temperature range, length of day, and growing season are similar.

For example, Wichita wheat, a Kansas favorite, shows such extreme variability at Akron, Colo., under conditions of limited moisture and higher altitude, that seed becomes ineligible for registration after only two growing seasons. Sorghums react to day and night temperatures and to length of day; one that blooms in 60 days in high altitude regions of Texas requires 100 days at a similar altitude in northeastern Colorado. Soybeans also are affected by the length of day. Hail tolerance is a necessary attribute for wheat in the High Plains especially, but it must not be at the expense of early maturity and good milling quality. Resistance to disease and wind are other features required in certain areas. Fertility maintenance by legumes and other fertilizer practices adapted to semiarid conditions poses another problem. There is need for suitable early maturing catch crops such as millet to replace crops abandoned because of unfavorable weather.

So, we still need to develop crops and farm practices better adapted to our seasons of dry weather, limited water supply in certain areas, extremes of heat and cold; crops tolerant of wind and hail damage; crops that will thrive in higher altitudes with shorter growing seasons; crops that ripen uniformly and can be handled in large enough units to permit mechanical harvesting; forage crops to anchor the soil; drought-resistant legumes for increased nutrition and maintenance of soil fertility; crops that will stabilize and enrich the natural economy of the region, which is generally a grain-grass-livestock combination, except where irrigation enables farmers to grow specialized cash crops. We need to know fertilizer practices that are most effective under specific conditions.

These problems were recognized 15 years ago when the Great Plains Drought Area Committee, headed by Morris L. Cooke, reported:

"There is no reason to believe that the primary factors of climate, temperature, precipitation, and winds in the Great Plains region have undergone any fundamental change. The future of the region must depend, therefore, on the degree to which farming practices conform to natural conditions. Because the situation has now passed out of the individual farmer's control, the reorganization of farming practices demands the cooperation of many agencies, including the local, State, and Federal Governments. In many measures the Federal Government must take the initiative, particularly in furnishing leadership and guidance."

What better foundation for such reorganization than the valuable work of the land-grant colleges and their experiment stations, as well as the field and research stations of the USDA, particularly since their studies and experiments have

been and can be sufficiently extensive and conclusive to suggest constructive reforms for the more abundant life. That guidance is essential is evident from this observation in the report:

"The settlers lacked both the knowledge and the incentive necessary to avoid these mistakes (overgrazing, excessive plowing). They were misled by those who should have been their natural guides (Federal homestead policy)."

Are we again going to permit those endeavoring to build farm homes in these regions to go blindly on without direction or leadership? We dare not, because of the further challenge of the report:

"The fundamental purpose of any worth-while program must be not to depopulate the region but to make it permanently habitable. Any other outcome would be a national failure which would have its effects, tangible and intangible, far beyond the affected area. * * * The future of the Great Plains involves the future not only of the more than 2,500,000 people now living there, and of their descendants; it involves also the future of the nearly 10,000,000 in the States affected, and more remotely but yet substantially the more than 120,000,000 people of the Nation. It is bound up with the development of a sound national farming policy upon which, in turn, depends our ability to provide both opportunities for and the requirements of a reasonable standard of living for all our pepole. We endanger our democracy if we allow the Great Plains, or any other section of the country, to become an economic desert.

"The Nation has profited by the courage and endurance of the people of the Plains. We have all had large responsibility for the direction of settlement and for the development of agricultural conditions in the area. We cannot discharge ourselves of the obligation thus incurred until we have helped them to create, within the natural and climatic conditions which can be prepared against but cannot be controlled, a secure and prosperous agriculture."

Conclusions of the committee were summarized in President Roosevelt's report, The Future of the Great Plains, made to Congress, February 10, 1937, in this statement: "The problem is one of arresting the decline of an agricultural economy not adapted to the climatic conditions because of lack of information and understanding at the time of settlement and of readjusting that economy in the light of later experience and of scientific information now available."

More recently (1949), a program for land and water development has been developed from the preliminary report of agricultural research projects for the Missouri Basin, by the Regional Technical Committee on Research, State Agricultural Experiment Stations, USDA and USDI cooperating. This is contained in House Document 373 and is popularly known as the Young plan.

This Missouri River Basin agricultural program proposed several classes of essential supporting research: (1) Conservation and management of farm and ranch lands; (2) management of forest and range lands; (3) reduction of water runoff and sediment; (4) development of irrigation; (5) development of drainage, and (6) research on weather-tolerant plants, insect control, farm machinery, and farm engineering for efficiency in use of labor and power. Each of the first five classes is needed to support a segment of the recommended land water, and forest development program. The sixth is of importance to all segments of that program.

To be more specific, farmers in the Great Plains and Missouri Basin need information along these lines:

1. Livestock investigations to determine—

A. Cost and number of pounds of pork, beef, lamb, and dairy products that can be produced on an acre of—

1. Buffalo and other native grasses
2. Adapted grain sorghums as grain, fodder, and silage
3. Adapted forage sorghums, as fodder and silage
4. Corn as grain, fodder, and silage
5. Rye-sudan grass pasture

Such investigations could be used as basis for tax adjustment in line with productive use of land and in determining size of farm units.

B. Best methods of storing reserves of feed and seed.

C. Economical wintering rations for livestock.

2. Feed and forage crop investigations to continue plant breeding and develop new varieties of feed and pasture crops and to secure facts on cultural methods to reduce crop failures.

3. Grass and shelter belt investigations to—

A. Develop strains and varieties of grass adapted to region, determine their feed and forage value, and develop methods of establishing stands of grass on cultivated land as well as depleted pastures.

B. To study methods of establishing shelter belts and forest belts and determine amount of protection provided by such belts in crop production, farm gardens, orchards, and livestock.

4. Soil and water conservation investigations to determine—

A. How to maintain proper organic matter and fertility levels in soils.

B. Effectiveness, cost, and value of conservation treatments such as terracing, contour farming, strip cropping, and listing with basin or damming equipment in crop production.

C. Effectiveness, cost, and value of deferred grazing, pasture corrugations, pasture contours, and pasture renovation.

D. Satisfactory method of controlling cactus or other undesirable and even poisonous vegetation on range land.

E. Management of sandy land to prevent wind erosion.

5. Power and machinery needs on typical farms. Tract of land which may have been an economic unit from 1909 to 1920 may not be an economic unit in our present mechanized age; certainly it is not during drought and periods of low prices for farm production.

Importance of research is brought out further in a study, Integration of Irrigated and Dry Land Farming in the North Platte Valley in 1946 (Exhibit A) by Elco L. Greenshields and Stanley W. Voelker, agricultural economists, United States Department of Agriculture, where a 10 percent random sample was selected from 1,745 farmers in the 3 largest irrigated districts of the North Platte project (U. S. Bureau of Reclamation). This sample of 175 farm operators is equivalent to about 6 percent of the estimated total of 3,040 irrigated farms in the North Platte Valley. Data obtained by interviews with farmers, conducted in May and June 1947, included the 1946 crop production on both irrigated and dry land.

Data also revealed the lack of consideration being given by farm program planners to cropping practices best suited to the area to maintain soil fertility and reduce wind erosion. The abnormal influence of Government support prices during the war and postwar periods has disturbed the desirable trend in farm practices.

Recent shifts in crop distribution have both facilitated and hindered the feeding of livestock. The increase in barley has helped meet the urgently needed feed grain requirements but the shift from beets to beans means less available livestock feed. The byproducts of sugar beets contribute greatly to the feed supply of the valley.

Farmers interviewed considered the increase in acreage of beans undesirable from the standpoint of soil conservation as well. A crop of beans on medium to light soil leaves the soil loose and subject to wind erosion during the following winter. Wind erosion is doubly serious in an irrigated area because land left hummocky must be releveled, and canals and laterals filled with wind-blown sand must be cleaned out before irrigation water can be applied.

Livestock feeding is essential on the irrigated farms of the North Platte Valley in order to maintain a proper cropping pattern. Five percent of the valley farmers have no livestock at all on their farms. Those whose livestock operations are predominantly raising calves or lambs made up 15 percent of the total. Two-fifths of the irrigation farmers in the valley can be classed as livestock feeders.

Livestock feeding of the valley farmers not only contributes an important part of their total farm income but is necessary to maintain a balanced and stable type of farming. The successful valley farmer considers his livestock feeding operations as a valuable source of manure. In addition to the value of livestock feeding in the maintenance of soil fertility is its value as a means of providing a marketable outlet for the livestock feed byproducts of the sugar-beet industry. Besides being one of the most important cash crops in this area, sugar beets provide one of the chief sources of roughage in the valley. Beet tops have no value except as a local livestock feed. The 40,000 head of cattle and 400,000 head of sheep normally fed each year by the 3,000 farmers certainly make up a fine record; but when these feeder operations are viewed as they actually exist, concentrated among a relatively few large feeders, the record is not so good.

Economies of the irrigation farmer and the rancher are thus seen to be closely tied together in the raising, marketing, and feeding of livestock. For the 1946–47 feeding season, stockmen in both nearby and distant ranch areas supplied directly to valley feeders one-fourth of their feeder cattle requirements and over four-fifths of their feeder sheep needs.

Furnishing feeder stock to an irrigated valley farmer, pasturing his herds during the summer, and leasing him tracts of pasture land are the primary con-

tributions of the dry-land rancher to a balanced and stable economy in the irrigated valley. Payment to the rancher for these contributions strengthens the economy of the dry-land agriculture. (The part that valley farmers play in maintaining an active local livestock market is a definite asset to the ranchers.)

The 1946 records of farmers in the North Platte Valley reveal that they had to buy nearly half of their feed grains and well over a third of their hay and roughage requirements. Alfalfa hay and beet tops make up the bulk of the roughage fed by valley farmers. Slightly more than half of all roughage used is alfalfa and a third is beet tops. Three-fourths of the farm operators in the valley bought some type of feed, excluding small purchases of poultry feed. Those who do not buy feed either have no livestock or have only a few head.

As a high percentage of the irrigated land is used for cash crops, an intensive livestock-feeding program is necessary for the maintenance of soil fertility. Few areas of comparable size in the entire country produce greater agricultural wealth over a long-time period than does this valley. The presence of the sugar-beet industry is a principal factor promoting the intensive feeding operations in the valley, and this in turn promotes area integration. If no beets were raised, the number of livestock fed undoubtedly would be much less.

Other valuable farm records that could be a basis for needed study are the annual reports of Pathfinder irrigation district, North Platte project (exhibit B). They give the most accurate account of production results that I have seen and reveal some startling variations in cost and returns. For example, one farmer produced 23 tons of beets at cost of $64.45 an acre; another got only 11 tons at a cost of $168.25. The top potato grower harvested 625 bushels at cost of $231.55 an acre; the low production of 325 bushels cost $197.35 an acre.

You will find other interesting data on the Pathfinder district: Pages 1–3, description of area and some problems; page 25, area cropped, seven major crops during 20 years; page 26, crop returns by class, 1928–50; pages 27–32, crop yield reports, 1950, by class; pages 36–37, cost of growing beets and potatoes; page 38, comparative average value of crops; page 39, comparative yields and averages; page 40, livestock census and on feed; page 44, status of water users, 1950.

To show benefits derived from irrigation, I submit a Burlington publication, Irrigation a National Asset (exhibit C) which presents facts and figures showing various ways in which irrigation development is of value to the Nation. Section headings give a very good idea of the range of benefits: Irrigation is an Economic Factor, Means High Returns to Irrigators, Population and Community Growth, Social and Civic Services Improved, Property Values Increased, Good Governmental Investment, Large Purchasing Power, New Markets, Good Customers, Improved Commerce, New Wealth, Opportunities, Supplements Corn Belt Production, and finally, Irrigation Is Important to All. You will note that authority for statements on these subjects is indicated in bibliography index on page 13.

On page 5, Irrigation a Good Governmental Investment, reference is made to amount of taxes returned to the Government from irrigated areas, authorities for the figures being F. D. Helm, treasurer, Uncompahgre Valley Water Users Association, Montrose, Colo. (8), and J. C. Page, Commissioner of Reclamation (9). In further support, I quote Secretary Chapman in a June 11, 1950, release from Region 6, Bureau of Reclamation, Billings:

"More than $6 billion worth of crops have been raised on Federal reclamation irrigated land since 1902. The value of these crops is about four times the total Federal investment of $1½ billion in constructing the projects. In addition, power users are paying the Government more than $32,000,000 annually for hydroelectric energy produced at reclamation projects. Individual income taxes paid by the Federal Government from 1916 until last July from reclamation areas, which might otherwise have been unproductive, amounted to $100 million more than the $1½ billion expended for construction."

Page 7, New Markets in the West, mentions increase in products for export and for consumption in certain Big Horn Basin, Wyo., communities. Page 8, Good Customers in the North Platte Valley, cites carload shipping data at Scottsbluff in the North Platte Valley of Nebraska, on the Burlington Railroad. (13) Carload shipments represent production exchanged for goods and services provided by labor and industry in other parts of the country. Generally, they are a good indicator of the purchasing power and consumer demand in a community, although they represent only about 25 percent of the total volume of goods. Less-than-carload, express, parcel post, and, in later years, trucking, account for the remainder.

On pages 8–9, Irrigation Improves Commerce, are impressive figures comparing the commerce of irrigated Scottsbluff County and eight central Nebraska counties where dry-land farming was the major practice. Incidentally, Minden in Kearney County and Holdrege in Phelps County are in that region but are now benefiting from the central Nebraska public power and irrigation district (Tricounty project), receiving water supply from Kingsley Reservoir, the subject of study by Dr. Filley and Frank Miller, Rural Economics Department, University of Nebraska (15).

On page 11, Irrigation Supplements Corn Belt Production, Senator Carl Hayden of Arizona, is authority for figures showing that irrigation is not competitive with agriculture in nonirrigated areas (11).

Another subject for consideration is the attitude toward repayment of construction costs by people receiving benefits from irrigation projects. I refer to the Frenchman-Cambridge irrigation district on the Republican River in southwest Nebraska, above Harlan County Dam, and to the Bostwick irrigation district on the Republican in south-central Nebraska, below Harlan County Dam, as typical. On the Frenchman-Cambridge project, 65 percent of the landowners signed petition for organization and voted 318 to 31 in favor of the district. On the Bostwick, 85 percent of the landowners signed petition, and voted 191 to 20 for the district. This degree of approval plainly indicates their willingness to assume the obligation of repaying construction costs. Both districts are organized under Nebraska law giving the district power to levy tax on the irrigated lands for repayment of the obligation.

But there is probably one concession the reclamation irrigator would like to ask of the Government. That is, that in repaying construction contracts he be permitted to pay a percent of the crop produced on the land each year instead of a fixed annual amount, as is now the case, and this crop percentage payment to continue until construction charge is repaid. Such a plan would match the irrigator's ability to pay with his assessment, in good years or bad, under high prices as well as low prices of farm commodities.

Even with the wisest guidance and procedures developed, there will still be nature's hazards to contend with, bringing losses such as are reported by the Red Cross on August 1, 1950, in exhibit D.

We feel that the record of the Great Plains and the Missouri River Basin in the past century is not too bad, considering that the problems were new and complex, that the people were inexperienced in coping with climate and soil conditions here, and sometimes were subject to impractical public land policies and other unrealistic government regulations. But we still need additional research and investigation to show the best ways to achieve maximum production and to carry our full share of responsibility in the national economy.

Something of the struggles and subsequent agricultural development of the area is told in following sketches of the Sand Hills and High Plains regions.

SAND HILLS

The Statistical Gazeteer of the United States, published in 1853, stated that the central portion of Nebraska Territory was an unprofitable, irreclaimable wilderness, with scarcely an oasis to relieve the monotony of its dreariness. No doubt this statement was based largely on notes of Captain Fremont who, en route to Utah and California in 1842, labeled the region "Great American Desert."

Even the land-hungry homesteaders of the early 1860's were checked when they reached the Sand Hills country, although a few adventurous ones penetrated them, picking out choice locations along lakes and rivers for trapping. But generally, the Sand Hill "desert" was considered unsafe for man or beast to roam in. Line riders were stationed all along the edge of the sand hills to keep cattle from drifting into these hills during storms.

Jim Dahlman, later Omaha's "cowboy mayor," used to tell the story of a terrific snowstorm in March 1878, which drove 6,000 head of the Newman cattle through the lines, forced the men to let the herds go and seek shelter for themselves. Along in mid-April, Foreman Billy Irwin picked a dozen good men and horses and set out to round up the cattle. Another blizzard overtook the rescue party but they finally got under way again. Soon they began to find cattle perfectly contented and thriving on the succulent grass and pure water in the valleys.

Even more surprising, they came upon native cattle, fat as any ever brought out of a feed lot—unbranded mavericks from 1 to 4 years old that had never

had any feed except native grass, and this was April, after a terrific winter. Plainly, a stockman's paradise had been overlooked in the Sand Hills. It was not long, however, until the newly discovered cattle kingdom was swarming with herds of the Circle Dot, Hord, Carter, Cummins, Spade, Star, Castle, and other ranches.

Today we know and appreciate the 22,000 square miles of Sand Hills as Nebraska's great cattle-raising district because of the healthful climate, cheap grazing lands, plentiful supply of good water, abundant production of pasturage and hay every year, and easy accessibility to eastern feedlots and great consuming centers. Time and again, when grazing fails in other States, many cattle have been shipped in to be pastured in the Sand Hills. During the 1930 drouths, thousands came from as far away as Texas.

There are over a million cattle in the 19 counties comprising the Sand Hill region, nearly 30 percent of Nebraska's total cattle population. That is more than seven times as many as were counted in 1890, during the days of the cattle kings and the open range, when the 156,530 head in the Sand Hills were only 8 percent of the State total. S. R. McKelvie, owner of By the Way Ranch and former Governor of Nebraska, calls it "God's Cow Country" and tells you more about it in later pages.

The Sand Hills are a sportsman's paradise. Lakes abound with black bass, "inch for inch, pound for pound, the gamest fish to be found." Perch, crappies, sunfish, bluegills, pickerel, bullheads are plentiful. In the streams (Dismal, Middle Loup, North Loup, Snake, Rivers, Big Gordon, and Boardman's Creeks) are rainbow trout, bass, channel and mud catfish, chubs, etc. The lakes are nesting ground for ducks and other waterfowl. During migratory seasons, numbers are augmented by thousands of ducks, geese, snipe, etc. Trapping is a sideline of many ranchers who find the muskrat fur business profitable.

Near Valentine are the Valentine and Fort Niobrara National Wildlife Refuges, established to conserve and protect wildlife of the region; at Crawford is the United States Fish Cultural Station—all described in later pages.

Nature endowed the Sand Hills with surface riches, but conservation of this wealth had to be learned by man. That lesson is part of the romantic, adventurous past, told in the rise of the cattle kings, influx of the Kincaid homesteaders, the struggle between the two elements to control the rich grass lands and, finally, return of the land to livestock operations. It is an outstanding example of what can be accomplished under free enterprise.

In the early days no one was responsible for preservation or development of the range. It belonged to the Government and was used as free range by the cattlemen who had ranch headquarters on their homesteads along the streams. The grazing practice was to take as much off the land as possible in as short a time as possible, then move on to fresh pastures. This and the prairie fires denuded the range, causing the sandy soil to shift and blow.

With passage of the Kincaid Act, April 28, 1904, homesteaders flocked in. That law permitted entry on 640 acres instead of the usual 160 which Congressman Moses P. Kincaid, of Nebraska, knew was inadequate for practical livestock farming. It applied only to the Sand Hills region of Nebraska but was the pattern for the Enlarged Stock Raising Homestead Act of 1916, applicable to all stock-raising lands of the West.

Looking back, it may appear that those Kincaiders paid a regrettably high price in hardships and disappointment because the Sand Hills were not generally suitable for farming, but they served the good purpose of getting public land into private ownership, the only way it could be managed under public-land laws at the time. Then the livestockmen were able to buy enough land from the disillusioned Kincaiders to make economical operating units. This marked the beginning of the livestock industry in the Sand Hills. They fenced the land and began building up the range to its present excellent state. In fact, they are still building and conserving the natural resources of the region so that the community, the State, and the Nation will continue to benefit.

Record of the Sand Hills shows what can be done by individuals in independent soil-conservation practices, without Government bonuses for doing what should be done to protect the land and maintain its productivity. Some of those practices are: Proper placing of wells and windmills to balance the grazing on the range, resulting also in greater weight gains when cattle are not forced to go too far to water; creep feeding, strip cropping, use of brome and crested wheat grasses, rotation grazing, seeding legumes in hay meadows to improve feeding value of hay, building reserves of hay and other roughage, using sprinkler irriga-

tion to produce protein feeds. Sprinkler irrigation is particularly well adapted to the topography and soil types in the Sand Hills. Water can be applied without leveling or disturbing the soil. On a later page, Gleen Buck tells how they do it at Rolling Stone Ranch near Wood Lake—typical of many progressive Sand Hill outfits.

A transient industry in the Sand Hills was potash reduction during World War I, when supply from Germany was cut off. Antioch, at the west edge of the Sand Hills, was center of the largest potash industry in the world for a time. Three thousand people lived and worked in Antioch, 1,000 in Lakeside. Today both are only ghost towns. Potash Reduction Co. established the first experimental plant at Hoffland in August 1916. Soon there were five large plants in Antioch, each costing over a million dollars to build, two others of similar size at Lakeside, and seven smaller plants inland from Antioch.

Potash salts were obtained by boiling and forced evaporation of water from alkali lakes, then ground, sacked and shipped to cotton-growing areas as a necessary treatment to make cotton mature. The salts were also an important ingredient in gunpowder. Highest price paid for the salts was $65 a ton. A carload of salts required one car of crude fuel oil and two cars of slack coal to produce it, so output of six to eight cars of potash daily meant a sizable inbound movement of materials. The Burlington built extensive yards and depot to handle the traffic. Freight receipts averaged $1,000,000 a year during the peak, and Antioch ranged third in tonnage on Burlington Lines West. By December 1922 imports were restored, foreign competition was too stiff, and the companies went into receivership. Scrapping of plants began a year later. Since then research has developed newer, cheaper methods so it is not likely that the potash industry of the Sand Hills will ever rise again.

THE HIGH PLAINS

The cattle business of the High Plains grew out of the necessity of the emigrant on the Oregon Trail who would trade two of his worn-down, footsore oxen for one fat work steer as he passed through to the Northwest, and of the Overland freighter who brought supplies to the new settlements springing up in the West.

The idea prevailed among the early freighters that neither man nor beast could live in the western part of Nebraska after snow fell, but by 1850 a few traders were grazing stock all over the plains of Nebraska and Wyoming, with no shelter but the hills and no feed but the wild grasses.

However, the practice was not widely known until the late 1860's when fate, in the guise of Indian raids, winter storms, and the contrariness of the critters themselves, revealed the fact that cattle lost or abandoned on the plains turned up later, alive and in good condition. For example, Coad Brothers' oxen, driven off in 30-below temperatures by Indians and later abandoned, drifted back to camp months later, sleek and fat. Ed Creighton's bull outfit, turned loose when winter overtook the Atlantic & Pacific Telegraph crew, was rounded up in the spring with 98 of the 107 head safe and sound. Other cattle simply wandered away from the hay provided them to graze upon the cured and curled herbage in the draws and on the hillsides.

Some of the alert traders, builders, and settlers concluded that if oxen could survive and flourish on the open range of the Plains region, other cattle could do the same. In 1868 they began to bring Texas longhorns from the South by the thousands, establishing themselves upon advantageous locations and assuming "possessory" rights such as were recognized in those days, gradually becoming owners, nominally at least, of the whole Panhandle region. When the Coads sold their properties in 1883 for close to a million dollars, they surrendered "possessory title" to 220,000 acres, along with 21,829 head of cattle, 180 saddle horses, wagons, saddles, camp outfits, etc.

In 1870, 100,000 head were driven up from Texas to the northern grass regions and by 1873 the fact that cattle could be raised at an enormous profit upon free grass of the public domain west of the Missouri River was well established. If streams were lacking to water these increasing herds, the cattlemen remedied that want by sinking wells to fill tanks and make pools and lakes. The longhorn drives lasted until about 1882.

Settlement by whites on the north side of the Platte was contrary to terms of the Fort Laramie treaty with the Indians in 1853, so establishing and protecting these ranch outfits meant frequent fights and skirmishes between the races. When the Sioux Indians were finally located at Pine Ridge and Rosebud Agencies

in 1878, the United States Government was under agreement to supply them regularly with fresh beef, the buffalo being nearly gone. Most of the fresh beef on foot was in Texas at that time, or moving north from Texas by the great cattle trails to the railway shipping stations in Kansas and Nebraska. Ogallala was an important shipping point for these cattle coming off the trail. Our route from Grant to Ogallala shows us the short-grass country trampled by the longhorns and roamed by the buffalo. Now it is a region of diversified farming, with quite a little dairying.

Texas people founded the first ranches in Sheridan County—the Newmans and Hunters who settled along the Niobrara. They had contracts with the Government to furnish cattle for the Indians and the periodic "beef issue" was a frontier spectacle that lasted 40 years. The drove of longhorn cattle, the sunburned band of cowboys, the calling of the name of the Indian family entitled to the next animal, the opening of the chute, the wild dash of the 4-year-old steer across the prairie, the pursuit with rifle and arrow by the Indian group—this was the substitute for the old-time Indian buffalo hunt on the plains. It was a wild-west show eagerly witnessed by tourists from the East, as well as by those who comprised the frontier civilization—a blend of Sioux Indians, Texas cattlemen, Indian agency employees, and the troops at Fort Robinson.

The last wild buffalo in Nebraska was killed south of here in 1886. One of the most famous buffalo hunts was staged by Buffalo Bill Cody for the Grand Duke Alexis of Russia in January 1872. It was under the command of Gen. Phil Sheridan, stationed at North Platte. Three hundred Sioux warriors of Spotted Tail's tribe danced for the Duke. General Custer was in the party, too. As Buffalo Bill told it, the Duke was not too skillful in the hunt, although he rode Cody's horse, Buckskin Joe. But he got some skins for trophies and seemed satisfied. As a special honor, Spotted Tail requested that the Duke hunt with Two Lance on the second day. It was Two Lance who could put his arrow clear through the largest buffalo, a feat equaled by few. Two Lance and Chief Snow Flake were in the massacre party of 1873, north of Trenton in Hitchcock County, and it is probable that many of the Sioux were among those who attacked General Custer on the Little Big Horn in 1876.

When the cattle kings were acquiring their herds, nearly all of northwestern Nebraska was public domain. However, with westward advance of the railroads, homesteaders surged into the new country—land-hungry people from Eastern and Southern States. Nearly all of the newcomers undertook to farm their land, although little or nothing was known of the soil and climate. Disappointment in one or two attempts was enough to condemn the country and whole neighborhoods were deserted because of the settlers' ignorance of the nature and resources of the country.

Prices were low and credit almost unobtainable for strangers in a new country. Some who were able to make proof and secure patent mortgaged the land to insurance companies and left the country. Probably some stuck it out because they didn't have enough money to get away, but others realized they must conquer the land by adapting themselves to its conditions. It was a desperately hard fight against the elements, privation, loneliness, insects, Indians, white lawlessness, and the rivalry between cattleman and homsteader, but it developed the seasoned pioneer whom we honor today.

These were the people who really developed the region, brought with them law, order, social life, the preacher, the teacher, the church, the schoolhouse, and the home. They believed in rugged individual life, personal integrity, a government of simple justice, and defended those rights against the rougher, lawless element that always makes up part of a frontier civilization. They set the stamp of their character and opinion upon western Nebraska and it has not greatly changed since the days of homestead settlement.

Changes in the agricultural pattern of the region, however, have been numerous and surprising. A great agricultural and industrial empire has emerged. The soils have proved their adaptability to grains, seeds and potatoes. Long a wheat and potato country, its agriculture is becoming more diversified since a seemingly inexhaustible supply of ground water has made pump irrigation possible. First well was sunk by Koester brothers in 1936. Now 100 wells supply irrigation water to 16,000 acres. Increasing interest indicates that 300,000 acres will be under irrigation within a few years. Already the sugar-beet acreage is 2,200; beans, 4,000; potatoes, 3,500.

Nebraska certified seed potatoes find a ready market in Southern States and in Mexico, Cuba, and Bermuda because of their good performance and resistance to disease. Mustard and safflower have been grown experimentally at Alliance Experimental Farm and may prove valuable crops in the future.

Four hundred and twenty thousand acres under irregation along the North Platte River has transformed that valley into the sugar bowl and feeding trough of Nebraska. Twelve thousand acres on the Mirage Flats project will work a similar change in Sheridan County. The rougher portions of western Nebraska still produce quality livestock, with even better herds in prospect as result of work in beef cattle breeding, grazing and pasture management carried on at the Beef Cattle Research Station at old Fort Robinson by the University of Nebraska cooperating with the USDA Bureau of Animal Industry. Incidentally, the fort has an interesting history as a pioneer outpost, then a breeding station for polo ponies for United States Army, and as war dog (K-9) training station during World War II.

Recent discovery of oil in Cheyenne County points to another source of wealth for the future. Thousands of acres have been leased throughout the Panhandle area for test drilling, some farmers getting more for the leases than from the current crop. Forty wells are producing 4,500 barrels of oil daily.

Sidney, Nebr., also played an important part in the early settlement of the High Plains. Site of a military post since 1857, it was laid out in 1867, with no town nearer than 100 miles in any direction.

When gold was discovered in the Black Hills in 1876, Sidney really boomed. Being the best located point on a railroad, stage and freight stations were soon established, not only to South Dakota but to all military posts and Indian agencies in the West. It was nothing uncommon for a million pounds of freight to leave Sidney daily. Hundreds of strangers thronged the streets, rough talk filled the air, fights grew out of liquor and greed, not a few of them ending in murder.

During Warld War II, the Sioux ordnance plant was established at Sidney. It is a permanent peacetime storage installation, occupying 30,000 acres.

EXHIBIT A

Integration of Irrigated and Dry-Land Farming in the North Platte Valley, in 1946

(By Elco L. Greenshields and Stanley W. Voelker, Agricultural Economists[1])

SUMMARY

Object of investigation.—This report gives the results of one of the economic studies in a series initiated to determine the probable stabilizing effects on the agricultural economy of irrigation projects developed in the Missouri Basin. The investigation was directed specifically to the following questions: (1) To what extent is irrigation farming in the North Platte reclamation project integrated with the economy of the surrounding dry-land areas? (2) What stabilizing effect does the irrigated area have on the surrounding dry-land areas? (3) What factors hinder or encourage the integration of an irrigation economy with that of a dry-farming or grazing economy?

Procedure followed.—A 10-percent random sample was selected from the 1,745 farmers in the three largest irrigation districts of the North Platte project of the United States Bureau of Reclamation. This sample of 175 farm operators is equivalent to about 6 percent of the estimated total of 3,040 irrigated farms in the North Platte Valley. Data obtained through interviews with these farmers, conducted in May and June 1947, included the 1946 crop production on both irrigated and dry land, the disposition of crops produced, feed purchases, and livestock operations. These data were supplemented by annual crop and livestock census reports of the Bureau of Reclamation and by information from other secondary sources. Other information was obtained from local agricultural workers, grain dealers, managers of livestock sales rings, officials of irrigation districts, managers of sugar factories, dry-land farmers, and ranchers.

Findings.—The economy of the dry-land agriculture that surrounds the North Platte Valley is benefited by the exchange of commodities and services with the irrigation agriculture of the valley and, to a limited extent, tracts of dry land are integrated into the operating units of the irrigated valley. The dry-land

[1] D. S. Mitchell, of the Bureau of Reclamation, and Harry A. Steele, of the Bureau of Agricultural Economics, planned the scope of the investigation here reported, and the general procedure. Wallace B. Hampton, Edwin P. Vandershaf, and Lyman W. Wallin, of the Bureau of Agricultural Economics, assisted with the collection of data from farmers and others in the North Platte Valley.

economy also derives benefits through the commercial, professional, and public services which are largely an outgrowth of the intensive irrigated economy rather than the sparse economy of the dry-land areas. The benefits received indicate only partial interdependence between the dry-land and irrigated farming economies of the North Platte area, however. Much of the dry-land agriculture would be unchanged if irrigation had not been developed in the valley. The dry-land wheat farming in this part of western Nebraska and livestock ranching in the nearby Sand Hills, as now undertaken, are basically sound types of farming for those areas, irrespective of any stabilizing effects of irrigation.

The dry-land country surrounding the North Platte Valley contributes more to the actual operations of irrigated farms than the valley contributes to the operations of ranch and dry-land farms. To the over-all economy of the whole area, however, the contribution of the valley probably exceeds that of the dry-land segment. Through the concentration of population, the irrigated part now has various educational, recreational, financial, and other institutional developments which serve and benefit alike both the irrigated and dry-land farmers.

Integration of the economy of the irrigated valley with that of the surrounding dry-land country comes about through the use of land, exchange of labor, exchange of livestock, exchange of livestock feed, exchange of farm-produced fertilizers, and through the use of a mutual market for crops and livestock. In addition, the dry-farming and irrigation-farming economies are integrated in a less tangible way through educational, recreational, and other public facilities.

Some high lights of the specific findings of the investigation covering the 175 farmers are:

1. The integration between the valley and the surrounding dry-land country comes about largely through the use of a common market for both the purchase and the sale of farm products and for the purchase of consumer goods.

2. Less than 8 percent of the valley farms are full-scale integrated irrigated and dry-land operating units. Only 3 percent of the farms have dry cropland lying outside the project area, and only 5 percent have pasture land outside the project area.

3. Of the valley farm operating units, 15 percent hire the use of dry-land pasture for summer grazing outside of the project by the payment of a specific fee per head, per month.

4. Exceeding in importance the integration found within operating units is that brought about through the exchange of livestock and livestock feed. This exchange is mostly the result of livestock-feeding operations undertaken by 40 percent of the valley farmers, in 1946.

5. The cash-crop and livestock-feeding type of economy in the valley encourages integration with the economy of the surrounding dry land. The unavailability of pasture land to the valley farmer means that most of his feeder stock must be bought from dry-land farmers. Moreover, those feeding operations provide the dry-land farmers with a good market for whatever surplus feed they produce.

6. Livestock feeders in the valley raise only 2 percent of their feeder cattle and less than 1 percent of their feeder sheep. They obtain directly from ranchers, within a 50-mile radius, 15 percent of their cattle and 2 percent of their feeder sheep. From beyond a 50-mile radius they obtain directly from ranchers 13 percent of their feeder cattle and 84 percent of their sheep. They acquire through sales rings the remainder of their livestock which is brought in mostly by range livestock men.

7. The valley feeders bought nearly half their grain requirements (including dried beet pulp) and more than one-third of their hay and roughage (including beet tops and wet beet pulp) during the 1946–47 feeding season. Of the corn purchased, 6 percent came from nearby dry-land farms and 83 percent from the part of the corn belt lying in central and eastern Nebraska. Of the barley purchased, 33 percent came from surrounding dry-land farms.

8. Virtually none of the feed produced in the valley during 1946 was bought by dry-land operators. During drought years, however, some feed was secured from the valley to maintain breeding herds of the dry-land units, and wintering of range cattle in the irrigated project was common.

9. Many dry-land farmers bring their trucks to the valley every fall to assist with the beet harvest, and nearly one-third of the laborers in the sugar factories each fall and winter come from surrounding dry-land farms. This exchange of labor, although not exceedingly large, is a significant aspect of integration and might be the phase of integration which would have a telling influence on the economy of the dry lands during prolonged periods of drought.

10. Factors that hinder area integration include the essentially independent nature of irrigation, dry-land farming, and ranching, as undertaken in this area; the high percentage of tenancy in the valley and the landlord-tenant problems it creates; the lack of experience and aptitude for livestock feeding among some valley farmers; the lack of sufficient capital at reasonable interest rates to finance feeding; conflicts between dry land and irrigated land in the same unit for the operator's time; the unsuitability of the machinery commonly found on irrigated farms for extensive dry-farming; and the fact that calves, which constitute a major class of cattle marketed by the surrounding ranches, are not now favored by most valley feeders.

Limitations of findings.—The findings of this survey have limited application since the analyzed data cover only 1 year, 1946. Feeding operations were unusually low during 1946–47, and the 1946 crop distribution was still somewhat distorted because of wartime price relationships. The year was one of several successive years of above-normal precipitation. These factors tend to bias a picture of area integration that is based on data for 1946 alone.

The findings are further limited by the fact that the bulk of the information analyzed was obtained only from irrigation farmers. Data capable of being handled statistically were not obtained from adjacent dry-land farmers and ranchers.

Another limitation was the schedule used for interviewing the irrigation farmers. Time did not permit a pretesting of the schedule in the area, and in some respects it did not fit local situations. The specific information called for, for example, did not reveal the full range of livestock operations through which most of the integration takes place.

Finally, the implications of the results of this investigation cannot be assumed to be uniformly applicable to other areas throughout the Missouri Basin. Both the irrigated valley and the surrounding country have peculiar characteristics that are not likely to be repeated elsewhere in the region. Unlike many other irrigated valleys, the North Platte Valley is large enough to have developed independent agricultural enterprises, such as the sugar-beet industry. The nearby livestock range area of the Sand Hills is relatively more stable than any other range areas of the upper Missouri Basin. The Sand Hills normally produce a surplus of hay. In the vicinity of the North Platte Valley, native hay from the Hills probably was more important for maintaining herds during the drought of the 1930's than was the alfalfa hay from the irrigated farms.

DEVELOPMENT OF IRRIGATION IN NORTH PLATTE VALLEY

Irrigation in the central North Platte Valley began with diversions from tributaries of the river by the first homesteaders in the 1860's. These pioneer projects were established mainly for the production of winter feed for cattle that were grazed on the surrounding range. Irrigation thus was first used to supplement the existing range-livestock type of agriculture. As these early diversions were enlarged and extended and new projects were constructed, irrigation was used increasingly for cash-crop farming.

But irrigated farming in this valley has not become completely divorced from the surrounding dry land. The dry-land farmers and ranchers have continued to depend on the irrigated land for a limited quantity of emergency winter feed supplies. The irrigated farmers have come to depend on the range for summer grazing of livestock and the feeder cattle and lambs for their winter livestock fattening operations.

The part of the North Platte River Valley covered by this investigation extends eastward from the Whalen Diversion Dam, located a few miles above Fort Laramie, Wyo., for 128 miles to about the eastern boundary of Morrill County, Nebr. The irrigated part of the Valley varies in width from about 2 to 18 miles. It includes the lands under the three Bureau of Reclamation canals, Interstate, Fort Laramie, and Northport, and the lands under 26 other canals and ditches which divert from the North Platte. Also included are the lands irrigated from seven canals in lower parts of two tributary valleys, Horse Creek and Pumpkinseed Creek.

This entire valley contains about 404,000 acres of irrigable land. An estimated 354,000 acres of cropland and native hay were irrigated in 1946. The nonirrigated but irrigable acreage is mainly in farmsteads, rights-of-way, waste and seeped lands, and subirrigated native pasture. (See table 1 for detailed information.)

AGRICULTURE IN NORTH PLATTE VALLEY

Agriculture in the North Platte Valley is primarily one of cash crops and livestock feeding. It differs markedly from agriculture in the parts of the North Platte Basin immediately above and below it. The part above Whalen, reaching to the headwaters, is primarily a hay-and-range livestock area, with cash crops important in only a few localities. The part immediately below the area of study is primarily given over to general livestock farming, with alfalfa, native hay and pasture, and fed crops the most important uses of irrigated land. Here sugar beets and other cash crops are minor.

Crop distribution.—Nearly half of the land in the valley is devoted to cash crops, according to records for the North Platte reclamation project and the 175 farms surveyed (table 2). Corn and cereals constitute about one-fourth of the irrigated cropland acreage, hay and forage more than one-fifth. Estimates of crop distribution for several of the nonproject canals indicate that agriculture is more intensive (more cash crops) under some canals than in the project districts and more extensive (more hay and pasture) under other canals. For the entire North Platte Valey, the percentage of cash row crops and forage crops is slightly higher than for the North Platte reclamation project, while the percentage of grains is lower.

Barley is the most important grain crop in the valley and alfalfa is the most important forage crop. Dry beans constitute the most important cash row crop, followed by sugar beets and potatoes. These five crops together take up about 80 to 85 percent of the irrigated cropland acreage. Barley and alfalfa, plus one or more of the cash row crops, are now used in most crop rotations. In typical rotations followed in the valley, potates or beans are planted the year alfalfa ground is broken up. Sugar beets are planted the following year, with application of barnyard manure, if available. After 1 or 2 years of sugar beets, barley is seeded with sweetclover. After the barley is harvested, the sweetclover is permitted to grow until the following May when it is turned under for green manure. Beans or potatoes are planted that year, followed by sugar beets. Most of the alfalfa is seeded with barley as a nurse crop.

For several years before 1941, a definite trend was taking place toward the development of a balanced crop and livestock-feeding economy. The abnormal influences of the war and postwar period have disturbed this desirable trend.

Records of crop distribution on the North Platte reclamation project for selected years from 1934 to 1946 show a rather consistent upward trend in barley acreage and the downward trend in the acreage of corn and oats (table 3). Barley out-yields corn in this area in terms of total digestible nutriends per acre. The valley isn't well adapted to corn; the altitude is too high, the nights generally too cool, and the growing season too short for consistently high yields of corn.

Another major shift in crops during recent years is the increase in the acreage of dry beans and the reduction in sugar-beet acreage. On the project, which comprises about half the irrigated land in the valley, the acreage of beans tripled from 1934 to 1941—an increase of 14,000 acres—whereas the acreage of sugar beets decreased 8,000 acres, or 22 percent. Since 1941, bean acreage has doubled—an increase of 23,500 acres—and beet acreage has fluctuated widely but has remained generally at about the same level. This continuing shift to beans is primarily in response to exceptionally high prices, coupled with the fear of a possible shortage of labor for the beets.

These recent shifts in crop distribution have both facilitated and hindered the feeding of livestock. The increase in barley has helped meet the urgently-needed feed-grain requirements but the shift from beets to beans means less available livestock feed. The byproducts of sugar beets contribute greatly to the fed supply of the valley. The total disgestible nutrients in the beet tops and wet beet pulp from 13 tons of beets (about the long-time average yield per acre for this area) is equivalent to the total digestible nutrients either in 2 tons of alfalfa hay or in 53 bushels of barley.[2] Numerous feeding trials by agri-

[2] These estimates were computed from figures on average composition given in Feeds and Feeding, by F. B. Morrison, 20th edition, appendix table 1. It was assumed that the weight of tops (green-weight basis) would be 72 percent as much as the weight of beets and that the weight of the pulp would be 27 percent as much as the weight of the beets. Both of these factors are commonly accepted by sugar-company officials and agricultural technicians. Another accepted conversion factor for estimating production of tops, which is coming into wider use, is that the dry matter in the tops is 10 percent as great as the weight of the beets produced. Use of this factor gives somewhat higher values for tops than does the factor used in this study.

cultural experiment stations consistently show replacement values for beet tops and pulp, fed in conjunction with alfalfa and grain, to be somewhat higher than these computed equivalents.

The increase in acreage of beans is considered undesirable from the standpoint of soil conservation as well. A crop of means on medium to light soil leaves the soil loose and subject to wind erosion during the following winter. Wind erosion is doubly serious in an irrigated area because land left hummocky must be releveled and canals and laterals, filled with wind-blown sand, must be cleaned out bef re irrigation water can be applied. About half of the total increase in bean acreage from 1941 to 1946, under project canals, occurred in the Pathfinder irrigation district where soils are light and sandy. Here, where a large part of the class 5 land was broken out during the war expressly for bean production, wind erosion has become serious.

Livestock numbers.—No marked trend has occurred in the number of sheep and lambs on feed in the valley during recent years (tables 4 and 5). Considerable variation from year to year has taken place, depending largely on numbers of lambs available for feeding, the price of feeds, and the prospective spread between the prices of feeders and finished lambs. During the war, the average number of sheep and lambs on feed was 410,000. The number on January 1, 1947, however, was only two-thirds as great. High feed and feeder prices and the prospect for a very narrow feeding spread as long as price ceilings prevailed were the principal causes of this decrease.

A definite upward trend has taken place in number of cattle and calves fed out in the North Platte Valley, although this trend is not so apparent from the data for the reclamation project. Cattle feeding during the war remained relatively high. The average number of cattle on feed as of January 1 was 43,000 from 1942–46, nearly 30 percent above the average for the preceding 5-year period. Unlike sheep feeding, cattle feeding fell off only slightly during the 1946–47 feeding year, despite the unfavorable prospects for a profitable price spread in the fall of 1946, before price ceilings were removed.

The valley is definitely a marginal area for hog production, so hog numbers are subject to wide fluctuations. Normally, it cannot expect to compete with the Corn Belt. During the early 1930's there was a very favorable feed-hog ratio in the valley as well as in other parts of the country. Abundant feed supplies were available through increased corn acreage in both the valley and on the surrounding dry land, and feeding of wheat also became a common practice. Under these conditions hog numbers increased rapidly, reaching a peak in 1932. As price relationships returned toward normal during the middle 1930's, hog numbers in the valley decreased to about one-third of the peak. The numbers again increased rapidly during the early war years when a good market for live hogs of the valley existed in the industrial parts of Utah and the west coast. This market ended abruptly in 1944 for several reasons, including the reduction in freight rates on dressed meats from the Corn Belt to the west coast. As a result, hog numbers have declined rapidly during the last 3 years and are now below the prewar level. Hog production now is primarily for home consumption and local slaughter.

Beef and dairy stock cattle numbers increased somewhat during the war. Beef stock cattle have remained at this higher level since, but dairy cattle are now slightly under prewar numbers. These two classes of cattle are interchangeable to some extent. When local prices for butterfat are high, the farmers are likely to milk more of their beef and dual-purpose cows. The trend in number of horses and mules in the valley has been steadily downward for many years as a result of increased mechanization.

INTEGRATION OF LAND RESOURCES

Only a comparatively few of the farmers with headquarters in the valley use dry land for pasture or crops. Likewise, only a small number of ranchers and farmers surrounding the valley obtain irrigated tracts in the valley for feed crops or otherwise supplementing their dry-land operations. For the entire valley, the combined use of dry and irrigated land within operating units is negligible. For those relatively few farmers who have integrated units, however, the use of dry land is significant in both the size and the character of their operations.

Many of the irrigated farms of the valley have small acreages of nonirrigated land that is either idle, waste, used for pasture, or dry-farmed. These normally small acreages have little economic significance in the operation of the

farms. According to the survey, almost half of the valley farms include no dry cropland or pasture; 31 percent of the valley farmers have some dry-land pasture, but no dry cropland; and 22 percent have some dry land that is used for cultivated crops (table 6). Of the total land in the surveyed farms, the homesteads of all of which are located in the project, 56 percent is pasture land. About one-twelfth of this pasture land is classed as irrigable land. Only an insignificant amount of pasture land is actually irrigated. Of the total cropland in these farms, 15 percent is dry-farmed, that is, planted to crops with no application of irrigation water.

Integration with dry-farming land.—Nearly 80 percent of the valley farmers undertook no dry-land farming (table 7). Less than 4 percent of these obtained sizable tracts of land outside the project for dry farming. An additional 6 percent cultivated dry land outside of the project area only because their farms lie along the boundary of the project. The other 10 percent of the operating units containing dry cropland are located entirely within the area served by irrigation canals, but some of the land (mostly small tracts) is too high, rough, or otherwise situated so as to make irrigation impracticable. The dry cropland in these units within the project amounts to less than 2 percent of all land used for crops. The dry land used for crops by all operators is 17 percent of the total cropland. For a few farms, the dry-farming acreage constitutes a noteworthy part of the unit. Three of the survey farms, for example, contained 385 to 960 acres of dry farming land each, while 4 others contained 160 to 240 acres.

The character of the soil in the nonirrigable segments of the valley determines to a considerable extent whether dry farming is undertaken. A large proportion of the farms south of the North Platte River, in Gering and Mitchell Valleys, have dry-land farming than do the farms in the part north of the river. North of the river the soils are sandier and lighter in texture.

Integration with dry-land pasture.—A large part of the total pasture land in the farms covered by the survey is included in a relatively few farms that have large tracts of pasture outside of the project. Only 8 of the 175 farms surveyed contained pasture land situated above the main irrigation canals of the valley (table 8). These eight farms included 71 percent of all dry-land pasture. An additional 22 farms, or one-eighth of the total, were situated astride the upper main canals of the valley and thus included dry-land pasture which was adjacent to the irrigated cropland.

Means used to obtain dry-land pasture.—The ownership or lease of tracts of dry-land pasture by valley farmers accounts for only a part of the integration of their farms with the surrounding pasture land. Twenty-six of the surveyed operators, or 15 percent of the total, put livestock on pasture land outside the project during the summer (table 9). They hired the use of pasture land on the basis of a specified fee per head of livestock, per month. Most of them had only small herds. Two of these operators hired pasture for 100 to 115 head of cattle, but half had 15 head or fewer. Of the eight farmers with dry-land pasture tracts not adjacent to their home place, and outside the project, five owned such tracts. One of them owned a part of this land and leased the rest and two leased their nonadjacent tracts.

Extent of integration.—Thus, of the total farm land used by these 175 valley operators, 52 percent was dry-land pasture. Of their total dry-land pasture, 89 percent was beyond the limits of the irrigable area. Of that beyond the limits of the project area, one-fifth was adjacent to the home unit, with the remaining four-fifths out on the tableland some distance from the home unit. This distance ranged up to 18 miles. In addition to this pasture land, either leased or owned, used in conjunction with the irrigated farm, 26 operators hired dry grazing land on a fee basis during the summer for 622 head of cattle and calves—approximately 10 percent of the total cattle handled by all 175 operators.

INTEGRATION OF LIVESTOCK OPERATIONS

Livestock feeding is essential on the irrigated farms of the North Platte Valley in order to maintain the cropping plan that has been established. In these feeding operations, the irrigation farmer is dependent primarily upon both near by and distant dry-land ranches as his source of feeder stock. A few valley farmers raise a part of their stock, but most of them do this only by having integrated farm units comprising considerable acreages of grazing land. For the surrounding stockmen, the valley feeders provide an expanded market outlet, especially for their heavier feeder stock. The prices paid for feeder

stock by valley farmers are commensurate with prices paid in the central markets. The nearness of the valley market is an added advantage which lessens marketing costs and reduces the loss by shrinkage in transit. The convenience of trucking the livestock to nearby markets rather than preparing for car-lot shipments is another advantage enjoyed by the ranchers surrounding the valley, especially the smaller operators. Direct dealing by some of the valley feeders with ranchers saves commission and other sales costs. For those who patronize the local sales rings, commission and other costs are reported to be less than in the central markets.

Types of livestock enterprises.—Five percent of the valley farmers have no livestock at all on their farms (table 10). These include men who are just beginning to farm and do not yet have their operations fully established; farmers who are sick, elderly, or otherwise unable to meet the daily care demanded by livestock; and farmers who do not choose to keep livestock. Another 40 percent of the farmers have only small general-farm livestock herds. Most of these small herds include from one to five milk cows. Other herds are made up of a mixture of stock cattle. Those whose livestock operations are predominantly raising calves or lambs made up 15 percent of the total. Two-fifths of the irrigation farmers in the valley can be classed as livestock feeders, although some of these do very small-scale feeding. Some of the feeders also raise livestock. The small, general-farm type of livestock operator handles 14 percent of the total cattle on farms in the valley, virtually no sheep, and nearly half the hogs (table 11). Large-scale hog-fattening operations, while relatively important in the past, have just about passed from the scene in this area. Only 2 of the 175 operators covered by this survey can be classed as hog feeders, but these 2 handled nearly a fifth of all the hogs.

Most of the operators who are raising livestock are located in the Goshen and Pathfinder districts where large acreages of pasture land are interspersed throughout the irrigated lands. Livestock raising, to be sound economically, requires the use of pasture land, either irrigated or dry. Those who raised calves or lambs, even though they raised only a few, either had access to pasture through ownership or lease, or hired ranchers to keep their cows and calves on pasture during the summer.

The operators who are strictly livestock feeders handled nearly two-thirds of all the cattle. Those who fed only cattle made up a fourth of all operators, and they handled substantially more than a half of the cattle in the valley. Livestock feeders, including those who also raised livestock, comprised two-fifths of all operations and handled 65 percent of the cattle, 96 percent of the sheep, and 44 percent of the hogs. The operators who fed only lambs (14 percent of all operators) handled three-fourths of the sheep.

Livestock feeding operations.—Livestock feeding of the valley farmers not only contributes an important part of their total farm income, but is necessary to maintain a balanced and stable type of farming. These semidesert soils were never rich in organic matter. Peak production from the soils was not obtained when the native sod was broken, but only after 10 to 20 years of soil-building practices had been followed. Heavy cropping and leaching of plant food through the application of irrigation water puts an unusually heavy drain on the soil. Experience has shown that these soils must be enriched at regular intervals by the application of commercial fertilizer and barnyard manure and by plowing under green manure crops. The successful valley farmer considers his livestock feeding operations as a valuable source of manure.

In addition to the value of livestock feeding in the maintenance of soil fertility, is its value as a means of providing a marketable outlet for the livestock feed byproducts of the sugar-beet industry. Besides being one of the most important cash crops in this area, sugar beets provide one of the chief sources of roughage in the valley. Beet tops have no value except as a local livestock feed.

Size of feeding operations.—Despite the high value of livestock feeding for the maintenance of a balanced type of farming in the valley, relatively few operators undertake feeding on the scale required to obtain maximum benefits. When the total feeding operations for the entire valley are considered, they appear to be reasonably adequate to meet conservation and fertility requirements. The 40,000 head of cattle and 400,000 head of sheep normally fed each year by the 3,000 farmers certainly make up a fine record but when these feeder operations are viewed as they actually exist, concentrated among a relatively few large feeders, the record is not so good.

Eight percent of the surveyed farmers have no cattle, 83 percent have no sheep, and 57 percent have no hogs (table 12). Less than 4 percent handle more than

one-fourth of the cattle, while about half handle only 10 percent of the cattle. Sheep feeding in the valley is even more concentrated. The four largest sheep feeders in the survey sample handle 55 percent of the sheep and 12 percent of the operators handle 98 percent of the sheep. Hog production, being mainly a small enterprise, was more evenly distributed among the operators who have hogs.

Source of feeder livestock.—Of the 175 operators included in the survey, 55 (31 percent) fed cattle and 23 (13 percent) fed sheep. The original sources of most of the feeder livestock are the ranch areas, extending in some instances to Montana, Arizona, New Mexico, and Texas. So far as the individual operator is concerned, however, the source of his feeder livestock is more frequently a marketing agency (table 13). Ten of the cattle feeders depend on their own stock raising for their feeders but such a source furnished less than 2 percent of the total cattle fed in the valley during 1946, according to the survey (table 14).

A farmer who produces his own feeder stock must have an integrated type of farm. Some operators in the valley actually have two complete units, one a complete ranch set-up and the other an irrigated valley farm.[3] The successful integrated operation of this type has to be fairly large to cover overhead costs, and the two units should not be too far apart because the operator must travel between them frequently. On the large integrated units, the usual practice is to have a full-time tenant on the irrigated farm and a full-time hired man on the ranch segment of the unit. Information obtained from operators indicates some increase in the numbers of this integrated type of farms during the last few years. Many who do not now have this type of farm plant indicated a wish to extend their operations into the range area. Range land within a reasonable distance is difficult to obtain, however, so it is doubtful that much expansion of this kind will occur.

By far the majority of the operators use the local sales rings as a major source of feeder cattle. Livestock sales are conducted 1 day each week throughout the year at each of three active sales rings in the valley, located at Scottsbluff and Gering, Nebr., and Torrington, Wyo. The Scottsbluff sales barn handles about 20,000 head of cattle annually, plus a considerable number of hogs, but only a few sheep. The Gering sales ring handles about 26,000 cattle, 1,500 sheep, and 3,000 hogs annually. The Torrington sales ring handles annually about 26,000 cattle, 8,000 sheep, and 8,000 hogs.

The importance of these sales rings to the valley is indicated by the fact that an estimated three-fourths of all livestock handled by these rings either comes from valley farmers or is bought by valley farmers. Local ranchers supply about half of the feeder stock consigned to these sales rings and valley farmers, about one-fourth. The other one-fourth come from distant areas.

Sixty percent of the cattle feeders in the valley use these sales rings as the major source of their feeders. Forty-five percent of all feeder cattle that are bought are acquired through sales rings. Only 4 of the 23 operators who had fed lambs, had bought them at local sales rings. Less than 3 percent of all lambs fed were obtained from these sales rings.

About 18 percent of the cattle feeders in the valley buy their stock directly from ranchers; 11 percent deal with local ranchers within 50 miles, and 7 percent deal with ranchers that are farther away; 28 percent of the total feeder-cattle supply came directly from ranchers. Some of those who feed, particularly the larger ones, prefer to inspect the stock on the range before they buy. They believe they can get more nearly the type and condition of livestock which their experience has indicated to be most advantageous if they buy directly from stockmen.

Feeder sheep are shipped in from greater distances than cattle. Most of the sheep come from central Wyoming—from 200 to 400 miles away. Seventy percent of the sheep feeders get the major part of their stock from Wyoming; all but 15 percent of the sheep fed came from there. The usual plan for the large sheep feeder is to contract directly with the sheep rancher, before the lambs are raised, for a definite number at a specified price and under a specified set of conditions.

The largest source of feeder lambs for valley farmers, other than direct from the ranchers, is the commercial contract feeder. Seven percent of the sheep fed by the interviewed operators were supplied through contract feeders, who in turn obtain their stock directly from ranchers. The contract feeder does not

[3] Several large livestock feeder and stock operators, not included in the sample, were interviewed to learn about their methods of operation.

restrict his dealings to Wyoming ranchers to the extent the individual feeder does. One large contract feeder is reported to have bought most of his stock from ranchers in Texas and Arizona.

Several contract feeders are operating now in the North Platte Valley, but their operations are reported to have declined during the past few years. These contractors assemble their stock from a wide variety of sources and place them on farms under several types of contracts which normally provide that the farmer shares in none of the costs or profits of the undertaking. The farmer may or may not do the actual feeding and care for the stock. In most cases the farmer sells all of his surplus hay, feed, and beet tops to the contract feeder at the regular market price and is paid a wage for any work he does. Usually, a considerable quantity of feed (corn, protein supplements, and beet pulp) is required in addition to that raised on the farm; it is bought by the contractor. The main advantage of these types of contract to a farmer is the supply of manure he gets for soil building. Two of the surveyed farmers said they took care of the stock for the contract feeder without wages, other than the value of the manure. Only a few of the 175 operators did contract feeding during 1946, although a larger number reported having fed on a contract basis in former years.

Several definite reasons account for this decline in contract feeding. One of the largest feeding contractors in the valley reported that in recent years he has entered into partnership arrangements with farmers who have successfully fed out his lambs under contract for a year or two. The principal requirements are that a farmer must have demonstrated his ability to feed efficiently and must have accumulated enough capital so he can afford to take his share of the risk.

Then, too, some of the sugar factories formerly placed large numbers of livestock on farms under feeding contracts in order to encourage feeding by beet growers and to dispose of unsold wet beet pulp before it spoiled. The Scottsbluff factory still follows this practice. Under the contract used, the factory buys the farmer's grain, hay, and beet tops at local market prices and pays him a stated price per head, per day, for doing the feeding. The factory furnishes all other feed, including wet pulp, but the farmer must haul the pulp from the factory to the feed lot. The factory assumes all prices and feeding risks and takes whatever profits there may be. During the 1946–47 feeding season, an unusually large number of factory-owned cattle (2,500) were fed out on contract because of the reduced demand for pulp among regular feeders.

The Torrington factory, on the other hand, puts out cattle under a weight-gain type of contract, under which the contracting farmer furnishes all feed, including beet pulp bought from the factory, and is paid a stated amount per hundredweight of gain put on the cattle. The factory thus assumes all risks regarding livestock prices and the farmer assumes all risks regarding feed prices and feeding. Some years both parties may make a profit, while in others one or both parties may incur a loss. Only 600 head were fed out under this kind of contract during the 1946–47 feeding season compared with an annual prewar average of 4,000 head.

Under current conditions, many of the farmers are in a position to finance their own feeding. As they feel that they can now afford to take the risks, they prefer to work for themselves and to take all profits rather than to work for a sugar-beet factory or to divide the profits with a feeding contractor. As more farmers undertake their own feeding, and demand their proportionate part of the beet pulp from the sugar-beet factories, these factories have had to reduce their contract feeding. The factories and other feeding contractors, by supplying capital in former years, filled a very real need, but now that this need has declined they have become a relatively less important part of the total feeding enterprise in the valley.

Livestock marketing.—The normal flow of the bulk of the livestock into the valley is from the ranches as feeder stock to the valley farmers. From here, after the livestock are fattened in the farm feed lots, they are shipped to the slaughter market. Two-thirds of the cattle, seven-eighths of the sheep, and about half of the hogs that are marketed by valley farmers go direct to local packing companies or to central market packers (table 15). Virtually all of the remaining livestock marketed go through local livestock sales rings, for the most part on their way to the packing market. Of the fattened livestock consigned to these rings, local packers and butchers buy about one-third; the others go to more distant slaughterers (especially to Cheyenne and Casper) to speculators, or back to other feeders in the valley for more feeding.

According to the survey, three-fourths of all valley farmers marketed some livestock during the year ending May 1, 1947 (table 16). The local sales ring was the chief market outlet for 43 percent of the operators. One-fourth of those marketing livestock shipped directly to the central markets. A few farmers marketed through sales rings located at Alliance, Nebr. (56 miles from Scottsbluff), and Lusk, Wyo. (57 miles from Torrington). Less than 1 percent of the total cattle marketed by valley farmers went to these distant sales rings and no sheep or hogs were marketed here. Three-tenths of the cattle, one-tenth of the sheep, and two-fifths of the hogs were marketed through the local sales rings. Only three valley farmers in the sample sold cattle to nearby ranchers, and the number sold amounted to less than 2 percent of the total cattle marketed. Livestock sold to ranchers are generaly stock cattle, including calves, raised by the relatively few valley farmers who are engaged in small-scale dairying and livestock raising.

Probable changes in livestock operations.—What individual farm operators plan to do in the future in regard to livestock feeding is indicated by their statements of future intentions obtained through the survey (table 17). Two-fifths of them either plan no considerable changes or were undecided. Some who are uncertain about their livestock plans are worried about future feeding margins. Some of those who are undecided are faced with a lack of facilities, such as corrals, feed bunks, and water systems.

Fifty-five percent of the operators plan changes in the livestock enterprises. An expansion of winter livestock feeding is planned by 36 percent of those surveyed. Only three operators are planning to reduce their sheep feeding and none plan to reduce cattle feeding. If the increases in feeding planned by them are actually achieved, the total number of cattle and sheep fed annually would be from 15 to 30 percent larger than during 1946–47. Whether valley farmers carry through on their intentions depends on a variety of factors, the most important of which are feeder livestock prices, feed prices, and prospective feeding spreads (or the price differentials between feeder prices and the price of finished livestock).

Some of those who are planning to increase the livestock feeding do not have the necessary feed-yard equipment nor have they had experience in feeding livestock. The intentions of this kind of operator are not likely to materialize. The men who are likely to carry out their intentions include those who usually feed, but didn't feed at all last year or had curtailed their feeding because they were afraid of a narrow feeding margin. Others lack the necessary capital or credit. Thus, much of the planned increase in feeding is primarily a return to normal operations.

Expansion of farm breeding herds is planned by 15 percent of the valley farmers. Most of these are planning increases in either stock cattle or dairy cattle. Only two out of the survey sample plan to increase farm-flock sheep, and only one plans to raise more hogs. More of the men are planning to increase breeding herds in the sandy-soil localities of the Pathfinder District than elsewhere in the valley. Here many are planning to shift from cash row crops to alfalfa and permanent pasture. Only one of those surveyed plans to reduce the number of stock cattle he is carrying.

Extent of integration.—The economies of the irrigation farmer and the rancher are thus seen to be more closely tied together in the raising, marketing, and feeding of livestock than was indicated in the case of land resources. For the 1946–47 feeding season stockmen in both nearby and distant ranch areas supplied directly to valley feeders one-fourth of their feeder cattle requirements and over four-fifths of their feeder sheep needs. Indirectly, through sales rings, the ranchers supplied in addition about half of the feeder cattle for the valley farmer and about 3 percent of his feeder sheep.

Furnishing feeder stock to an irrigated-valley farmer, pasturing his herds during the summer, and leasing him tracts of pasture land are the primary contributions of the dry-land rancher to a balanced and stable economy in the irrigated valley. Payment to the rancher for these contributions strengthens the economy of the dry-land agriculture. The part that the valley farmers play in maintaining an active local livestock market is a definite asset to the ranchers.

INTEGRATION OF FEED SUPPLIES

A further tie-up between the North Platte Valley and the surrounding tablelands comes about through the exchange of livestock feed. Feed moves both from dry lands to the valley, and from the valley to dry lands. During the period covered by the survey most of the movement was from the dry land to the valley.

During severe droughts, however, little dry-land feed is grown and the movement from the valley could be expected to be substantially increased.

Source of livestock feed for valley farmers.—The 1946 records of farmers in the North Platte Valley reveal that they had to buy nearly half of their feed grains and well over a third of their hay and roughage requirements (table 18 and 19). More of the total grain feed used was raised in the Pathfinder District than was true in the other districts. In the Pathfinder District the operators did less livestock feeding relative to the feed produced, but they utilized a larger proportion of their total available cropland for feed crops. Also, a larger proportion of the total farm land there is pasture than in the districts south of the North Platte River, and dry-land pasture is more accessible to the valley farmers.

Four percent of the grain feed of valley farmers was raised on the dry land in the units both within and outside the project area in 1946. Most of the grain produced on dry land was barley, although some corn and dry-land wheat was fed. Of the grain feeds, more barley than corn is fed in the valley. Most of the barley is steamed, rolled, and mixed with 5 to 10 percent cane molasses, which makes a very palatable feed, according to valley farmers. Custom processing of barley is an important part of the business of feed dealers and elevators. Nine of the largest dealers reported that they steamed and rolled 24,400 tons of barley for farmers during the 1946–47 feeding season, compared with a normal annual business of about 25,000 tons. As the total tonnage of barley fed was undoubtedly below normal that season because smaller numbers of livestock were fed out, these figures indicate that the percentage of barley steamed-rolled is still increasing. For the valley farmers covered by the survey, about twice as much barley was fed in 1946 as corn.

Many of the livestock feeders in the valley use a ground corn-and-barley mixture in their feeding rations. Corn must be shipped or trucked in from the corn-producing country which extends up to 400 miles into eastern Nebraska. Of the corn fed, a fifth is raised by the farmers that did the feeding, while two-thirds of the barley is raised on the farms where it is fed.

Alfalfa hay and beet tops make up the bulk of the roughage fed by valley farmers. Slightly more than half of all roughage used in alfalfa and a third is beet tops. Wet beet pulp, corn fodder, and tame hay are the other roughage feeds. Alfalfa is the chief hay entering the local market. The valley farmers buy a third of the alfalfa hay they feed. Thirty percent of the beet tops fed are bought by the operator doing the feeding. Beet tops, as a rule, are not moved far from the farms where grown. Many of the beet-top purchases are landlord shares bought by tenant farmers who are feeders.

Three-fourths of the farm operators in the valley bought some type of feed, excluding small purchases of poultry feed (table 20). Those who do not buy feed either have no livestock or have only a few head. Three-fifths of the farmers bought some kind of grain feed or dried beet pulp. One-fifth bought some kind of protein supplement. A few more bought hay and other roughage than bought grain—63 percent as compared with 60 percent. Thirty-seven percent of the roughage fed was bought and 53 percent of the grain. The alfalfa hay that was bought represented 32 percent and the beet tops bought represented 30 percent of the total fed.

Barley and alfalfa are required crops in the rotations that have proved to be most successful in the valley. As not all operators are livestock feeders, some have livestock feed to sell. On the other hand, those who have livestock seldom raise all of the feed of all the kinds they need. Many sell surpluses of alfalfa and barley, but buy other types of feed for balanced feeding rations. Thus, as would be expected, a chief source of livestock feed for any particular group in the valley is other valley farmers. Of the 76 operators in the survey who bought corn, a fourth bought either from their own landlords or from other valley farmers. Of those who bought barley, more than three-fourths bought from valley farmers. Virtually all of those who bought alfalfa hay and beet tops got them from other valley farms.

For corn, the local sources are much less important than is the case for barley, alfalfa, and beet tops (table 21). Eleven percent of the corn purchases came from landlords' shares or other valley farmers and 6 percent from nearby dry-land farmers. Three-fifths of the corn that was bought came from local feed dealers who get their supplies mostly from a distance. Operators obtained 23 percent of their corn from direct inshipments, mostly from long-distance truckers. Those who buy direct from truckers reported an advantage by the saving of their own trucking costs from the local market, as these truckers deliver direct to the farm. They reported little or no price differential between these truckers and local feed dealers.

Dry-land farmers are an important source of feed for valley livestock farmers only in the case of barley. A third of the barley bought by valley farmers comes from the dry-land farmers. More than half the barley that is bought comes from other valley farmers and 12 percent from local feed dealers.

Feed shipments.—Corn, protein supplements, and other feeds are shipped into the valley by so many agencies that it is practically impossible to learn the total quantity. All available information points to the fact that these inshipments are very large. For many years before the war, railroads were the principal carrier. A survey by the United States Bureau of Reclamation showed that railroad inshipments in 1928 included 442 cars of corn, 18 cars of other grain, 156 cars of mixed feed, and 64 cars of cottonseed cake—a total of 670 cars. These figures probably accounted for 75 percent of the total feed inshipments that year, trucking and less-than-car-load inshipments accounting for the remainder.

In 1941, railroad inshipments fell to 310 cars, of which only 11 were corn. Reasons included a shortage of cars and a good corn crop in and near the North Platte Valley. Feed inshipments by rail were unusually high throughout the war, averaging 1,078 cars annually from 1943 to 1945, of which 675 cars each year were of corn. They fell to 673 cars in 1946 because of the acute car shortage during the latter part of the year.[4]

Even during the war, trucks hauled a considerable part of the feed inshipments. Some of the larger feeders have for long bought their corn from farmers in central Nebraska, about 200 miles away, and hauled it home in their own trucks. Commercial truckers have become active in the last few years. The car shortage during the 1946–47 feeding season increased the trucking. Some of the interviewed feed dealers estimate that truckers brought in three or four times as much corn as the railroads this year. Their estimates of the number of trucks doing the hauling ran as high as 200—mostly large trucks hauling 500 bushels or more in a load.

A summary of the feed transactions of the principal elevators and feed dealers in the North Platte Valley shows that the 1946–47 inshipments of corn were below normal and the outshipments of barley were above normal (table 22). In part, this is a reflection of the low number of livestock fed out this year. The unusually heavy outshipment of barley was primarily for brewing purposes, to make up for poor supplies in the traditional brewing-barley belt and the million bushels or so lost in the big Milwaukee fire. Were it not for this heavy "export" of barley, the inshipments of corn would have been less than they were. The quantity of protein supplements shipped in during 1946–47 also was much lower than usual, primarily because most of the dealers were unable to buy as much as they could have sold.

Disposition of feed produced in the valley.—A classification of farms by how the operators dispose of their feed crops provides an insight into the possible extent of integration of feed supplies (table 23). Here it is seen that an almost negligible number of valley farms produce no feed. On three-fifths of the farms the entire production was fed on the farm. On an additional one-eighth of the farms only the landlord's share, or a part of his share, was sold off the farm. A part of these feeds went to the landlords for their own feeding operations on other places.

Only 1 percent of the valley farmers sold all of the livestock feed they produced. Others, with only poultry or very few head of livestock, sold virtually all they produced. Seventeen percent sold some surplus feed. On an additional 9 percent of the farms that were tenant-operated, the operators disposed of a part of their share as well as the landlord's share.

For any particular feed, the disposal pattern was essentially the same as that for all feeds. However, not all feeds were produced on every farm. One-fourth of these farms grew no barley (table 24), and one-seventh no alfalfa hay (table 25). Of the farmers selling barley, half were tenant farmers and the landlord's share of the crop was sold. The same is true of alfalfa hay, although more farms sold alfalfa than barley, both as to total number and proportionate to the number growing the crop. Alfalfa was sold from one-fourth the farms. One-fifth of the farms disposed of barley. About one-fifth of all corn, barley, and alfalfa grown by valley farmers was sold (table 26). These were the main feed crops produced in excess of need on about one-half the farms. In addition, one-fourth of the oats were sold and about one-third of the tame hay. Some beet

[4] Data supplied through the courtesy of the traffic departments of the Union Pacific Railroad Co. and the Chicago, Burlington, and Quincy Railroad Co., Omaha, Nebr.

tops were sold—about 7 percent of the total production. Because of the large production of beet tops in the valley, this small proportion of the crop sold was equivalent to about one-fourth of the total alfalfa placed on the market by valley farmers. Only a little oats and tame hay was sold, as these were very minor crops.

Nearly 40 percent of all valley farmers sold some feed crops (table 27). More than two-thirds of those who sold feed, sold to other valley farmers or to livestock feeders. Only one farmer in the survey sold feed directly to a dry-land rancher. About 30 percent of those selling feed sold to feed dealers, and probably a part of the feed going to these dealers ultimately reaches dry-land operators.

Stabilizing effect of the valley on dry-land agriculture.—In an area of recurring drought like that surrounding the North Platte Valley, irrigation development would be expected to make its greatest contribution toward stabilization through the provision of a dependable supply of livestock feed. This valley provides such a supply each year. From two-fifths to two-thirds of the irrigated cropland is devoted annually to the production of feed crops and a relatively stable production of these crops is fairly certain. A prolonged drought covering not only the North Platte Valley but also the part of the basin above Pathfinder Reservoir would reduce reservoir carry-over to the point where supplies of irrigation water would be short. This actually occurred some years during the 1930's. A short water supply would be likely to reduce somewhat the average yields of feed crops. Other crops that cost more to raise, from the standpoint of seed and labor, are first irrigated with available water in the interest of sound economy on the part of an individual farmer. Thus, feed crops would be the first to suffer in the event of a shortage of water.

In spite of this second preference given to feed crops, some supplies of feed from irrigated land can be counted on during drought years. The important question is, whether the feed produced would be available for the urgent needs of the dry-land farmers during such general drought periods, or even when the drought is more limited.

This question is answered in part by the record of the normal distribution of the feed produced on irrigated land. Part of these feeds that are marketed outside of the valley each year would, without question, be available for any emergency needs. Whether any part that is normally consumed in the livestock operations of irrigation farmers would be available is not easily predicted. The needs of these irrigation farmers could not be expected to be materially lessened.

What actually happened to the feed supply grown during 1946 in the North Platte Valley has been discussed. Data for 1946, however, do not provide a full answer as to the probable stabilizing effect of irrigation-produced feed during a drought. Accurate records of the 1934–40 drought period would be valuable, but they are difficult to obtain now. According to Reclamation project census records, about 10 percent more of the irrigated cropland was devoted to production of feed crops during that period than has been true in recent years. It is probable that a shift to greater acreages of feed crops would be made in any future drought, because feed crops are less exacting in their demands for water than are row crops, and because of increased prices for feed relative to prices for cash crops. Such a shift from cash crops to feed crops might offset any slightly lower average yields of feed crops due to the shortage of water, with the result that the total available feed supply would be just as large or possibly even larger than that produced in 1946.

If these adjustments were made, the quantity of feed supplies for emergency needs of dry-land stockmen would be increased. However, in the absence of more specific information for the 1934–40 drought period, the adjustments which seem most likely to occur are largely in the realm of speculation. Only a fourth of the interviewed operators indicated that they would make a change in their cropping plans in the event of a severe drought. In their opinion not much adjustment would be possible. A fifth of those saying they would make changes said that they would merely cut out dry-land farming. Three-fifths of those indicating a change said they would reduce their acreage of irrigated row crops and plant more barley or alfalfa. A tenth said they would plant more cash row crops and less feed crops.

The normal feed requirements of the dry-land operator and the irrigated valley feeder are basically different. On the range, the livestock business is chiefly the raising of calves or lambs. Here the feed is grass, supplemented with protein concentrates and hay. In the valley, the chief livestock business is fattening feeder cattle and lambs for the slaughter market. Here the feed is hay, grain, sugar-beet byproducts, and protein supplements.

During years of short grass, the dry-land operator is primarily interested in supplementing his own feed with hay. On many irrigated farms hay is grown in excess of the individual farm operator's needs. But seldom is there any large surplus of hay in the North Platte Valley as a whole. During drought years a rancher must compete with the valley feeder for hay coming from farms that have a surplus. The rancher may be able to supplement his short grass with cottonseed cake and other protein supplements, but these are not produced on the irrigated land of this area. So far as feed is concerned, therefore, the principal stabilizing possibilities are through irrigation-produced alfalfa and other hay.

Some of the irrigation farmers complained that during the last 2 years it has been increasingly difficult to buy hay from other farmers. Some of the feed dealers and the larger feeders ship in a few hundred tons of alfalfa annually from central Nebraska. One reason why hay has not been raised in the valley for the surrounding dry-land areas, is its proximity to the Sand Hills where much surplus native hay is normally produced.

The wintering of range livestock on irrigated farms in the valley appears to have been a more important drought-emergency measure for stabilizing dry-land agriculture than the sale of hay and feed to dry-land operators. A third of the interviewed valley farmers said they would winter livestock on their farms during a severe drought. About one-half said denitely that they could not. Many of those who said they would, were merely indicating their willingness to help out during an emergency. A majority of them are not regular livestock feeders and apparently did not answer on the basis of either actual ability to carry livestock or expected profitableness of wintering a large number of livestock as compared with putting a smaller number on feed for the slaughter market.

Several barriers stand in the way of valley farmers in shifting from livestock fattening to livestock maintenance. Economical maintenance requires the use of large quantities of roughage and the use of pasture or stubble. Most valley farmers do not have very much of this kind of land and many mentioned this as a major reason why it would not be profitable for them to winter livestock during a drought. Others said they did not have the corrals or other necessary facilities.

Feeding a larger number of livestock on a maintenance basis than is now fed on a finish basis is physically possible. Whether this would be done in case of a severe drought would depend primarily on relative price incentives. In the absence of a definite price advantage for the maintenance of livestock, valley feeders could be expected to help by putting livestock in the feedlot earlier than usual. A price advantage over livestock fattening would be necessary to induce more than this.

Probable changes in cropping practices.—Changes in crop rotations planned by farmers in the valley, if carried out, will increase the livestock feed supplies. In some parts of the valley that are ill-adapted to intensive cash row crops, livestock farming eventually may be the major type. For the valley as a whole, however, major emphasis will probably continue to be placed on cash crops, not livestock-feed crops. Half of the interviewed operators said they plan some changes in cropping practice (table 28). Several are badly "out of rotation" and hope to get back to a better balanced system eventually.

Only a few plan to increase their dry-bean acreage and about a fourth plan a decrease of bean acreage or plan to go out of bean production altogether. Most of those who plan to increase bean production are in the localities that have good soil and no doubt are anticipating a continuation of the present good prices. More than half of those who plan decreases are in the Pathfinder district where a considerable increase in bean acreage has occurred on sandy soils. The planned decreases are primarily for the sake of soil conservation. The land now used for beans will be shifted to alfalfa, bromegrass, and other tame pasture, according to the farmers' present intentions.

Planned increases of sugar-beet acreages exceed slightly the expected decreases by some of the farmers. Most of those who plan increases are in the vicinity of the Lyman sugar factory which has been closed since 1943 but was expected to be reopened in 1947. The nearby operators are increasing their beet acreage so there will be enough beets to enable the factory to stay open so that beet pulp will be available for feeding. Most of the decreases planned in beet acreages are on the farms in the Pathfinder district where decreases are needed to prevent soil erosion.

Ten of the valley operators plan to increase their acreage of potatoes, while about a fifth are planning a decrease. Difficulty in marketing the 1946 crop, and fear that the Federal price-support program will be discontinued, are reasons for the planned decreases but in the Pathfinder district, soil conservation is probably a more important motivation than price relationships.

Five percent of the operators plan to decrease alfalfa acreage, while 19 percent plan to increase. Decreases are planned because of a wish for more cash crops. One operator frankly said that he planned to put his entire farm into cash crops in an effort to reduce the indebtedness on his farm which he recently bought at a definitely inflated price. He is foregoing proper rotations even though he realizes the magnitude of the job of rebuilding fertility of the soil in the years to come. The operators in better soil areas who plan increases in alfalfa are generally those who are attempting to get back to their prewar crop rotations.

Only about a seventh of the operators plan any change in the acreage of barley. The number planning to increase is about double those who plan to decrease. Most of those who plan to increase are trying to get back into rotation or to expand their feeding. In a few cases, the increase in barley will be merely a shift from corn. Ten percent of the operators plan to increase the acreage of tame pasture; most of these are in the sandy parts of the Pathfinder district.

Extent of integration.—All of these planned changes in cropping in the valley may increase the extent of feed integration. On the whole, in 1946, an insignificant quantity of livestock feeds produced on irrigated lands went to supplement the feed requirements of the surrounding dry-land farmers and ranchers. A more noteworthy part was played by barley grown on dry land in the livestock operations of the valley than was played by irrigated crops in the livestock operations of the ranchers. This would not necessarily be the case during drought years. During 1946, the range was good and the ranchers had very little need for hay or other feed from the valley.

The comment by several of the ranchers was that they could always buy a little hay in the valley during a drought. Moreover, large supplies of the by-product feeds from sugar beets in the valley each year are used by ranchers during a drought. One of the larger ranchers reported that during the 1934 drought he maintained his breeding herd by putting them in a sugar-factory feedlot.

INTEGRATION OF FARM LABOR

No attempt was made in the survey to measure the full extent of labor integration but the exchange of labor between the irrigated and surrounding dry-land areas is recognized as an important element of area integration. The small homestead-type of dry-farm units on the tablelands surrounding the valley have low annual labor requirements. Except for a few weeks at seedtime and harvest, these farmers are not fully employed. Irrigated farms, on the other hand, not only have comparatively high annual labor requirements, but they are likely to have heavy peak requirements as well. Most of the hired laborers come from outside the North Platte area—they are migrants, Mexican nationals, and Spanish-Americans from Texas and the Southwest—but dry-land farmers take work in the valley for short periods, especially at jobs that require the ability to operate mechanized equipment.

Farm labor.—During the drought and depression years of the 1930's many dry-land farmers supplemented their meager incomes by working in the valley. One of the small dry-land operators said that he practically made his living during that time by trucking for valley farmers. More recently, however, dry-land farmers generally have had good crops and higher incomes. Fewer of them are now interested in employment in the valley.

Some "dry-landers" assist with haying and small-grain harvest in the valley. Their work is mostly on a day-labor basis. The large combines used on dry-land wheat farms, for example, are not adapted to small irrigated fields. Furthermore, most irrigation farmers prefer to thrash their barley and other grain so that all of the straw will be saved for feedlot operations. Occasionally, a dry-land farmer custom-plows for irrigation farmers who do not have tractors large enough to pull two bottoms through alfalfa or sweetclover.

Probably the most important contribution of the dry-land farmers is helping with the beet harvest. Their trucks are in great demand for hauling beets to the beet dumps. Some dry-landers also haul grain from the elevators and wet beet pulp from the factories for livestock feeders during the winter and early spring.

Employment by irrigation organizations.—Some of the employees of irrigation districts and mutual ditch companies are dry-land farmers. They do maintenance and construction work during the nonirrigation season, when irrigation farmers are busy with their beet harvest and feeding. Some of the larger irrigation systems refuse to employ irrigation farmers as ditch riders because of the temptation to "hurry their rides" in order to get through by midafternoon and do their own farm work. A ditch rider who does a little dry-farming on the

side, however, is not faced with urgent farm work each day and can stay with his ride for 8 hours, thus insuring good water distribution and service for the patrons of the system.

Sugar-factory workers.—The six sugar factories in the North Platte Valley require a working force of about 1,800 during the "sugar campaign" (2 to 4 months) in addition to the year-round employees. About one-third of these temporary employees come from surrounding dry lands. Most of the others come from the towns in which the factories are located, although a few, particularly those performing specialized tasks, come from the Midwest and other distant areas. Very few of the workers come from the surrounding irrigated farms, because the sugar campaign coincides with a peak labor season for beet farmers and livestock feeders. The percentage of dry-land farmers at the individual factories varies from 25 to 40 percent of the entire staff, depending upon the number of workers available in the towns where the factories are located. All factory managers commented on the fact that the proportion of dry-landers among the factory workers was much higher during the 1930's than at present. As dry-land farmers generally have had several years of good crops and high prices, it is somewhat surprising that so many still come back to the factories annually. Some of the managers mentioned several dry-land farmers who they said "struck it rich" with wheat during the war, but had already applied for jobs in the 1947 sugar campaign. Their explanation was that these farmers keep coming back either from force of habit or because they like sugar-factory work.

Extent of integration.—The total amount of farm work done on irrigated farms by dry-land farmers is unknown, but it is believed to be only a small percentage of the total hired labor on irrigated farms. The importance of the dry-land farms to the valley is probably much greater than this percentage would indicate, because of the specialized skills and equipment the dry-lander brings with him. The sugar-beet industry, in addition to providing jobs to those on irrigated farms, especially in trucking beets and pulp, provided 2 or 3 months of work for some 600 dry-landers in the sugar factories and beet dumps, in 1946, and even more in previous years.

FACTORS PROMOTING AREA INTEGRATION

A complete picture of the agricultural economy of the North Platte Valley was not obtained for this investigation. In detail, the economy is subject to persistent change. Irrigation farmers have many alternatives in the crops they grow, the feeds they buy, and the livestock they feed. Prices are most important in determining their choice. Nevertheless, out of the information gathered for this survey, several factors may be indicated which promote or hinder the integration of irrigation and dry-land farming. Integration in the North Platte Valley stems largely from contractual relationships between dry-land operators and irrigation farmers, which are less tangible than the integration of dry and irrigated lands within the same operating units. Some of the factors discussed below pertain to only one type of integration, some to both types, and some merely determine which type of integration will prevail.

Type of farming in the valley.—The most influential factor promoting area integration—and one that is basic to others discussed below—is the prevailing type of farming in the valley. As a high percentage of the irrigated land is used for cash crops, an intensive livestock-feeding program is necessary for the maintenance of soil fertility. Barley and alfalfa fit nicely into the cash-crop rotations, and the feeding operations in the valley provide the market outlet for these crops. Livestock feeding on an irrigated farm rounds out the operator's labor requirements by keeping him more fully occupied throughout the year. The final result is a type of farming which produces a relatively high farm income. Few areas of comparable size in the entire country produce greater agricultural wealth over a long-time period than does this valley.

Sugar-beet industry.—The presence of the sugar-beet industry is a principal factor promoting the intensive feeding operations in the valley, and this in turn promotes area integration. If no beets were raised, the number of livestock fed undoubtedly would be much less.

Sugar-beet byproducts provide almost as much feed per acre as do alfalfa and other feed crops. Prices for beet byproducts are kept relatively low by both farmers and sugar factories compared with their replacement values in terms of hay and grain. Beet tops, for example, were sold by farmers during the

1946–47 feeding season for about half the replacement value in terms of alfalfa.[5] The factories could net $8 to $20 more per ton by shipping the dried pulp East, but the long-range policy of the companies is to have as much of the pulp as possible fed on the farms where the beets are raised. The future of the sugar-beet industry depends to a considerable extent on high yields; if farmers do not have yields large enough to cover their costs and make a profit, they will reduce the acreage they contract. A reduction in beet tonnage, because of either declining yields or reduced acreage, means operating factories at less than capacity, which in turn means higher unit costs and lower factory profits. It is these low prices for beet tops and beet pulp that enables feeders in the North Platte Valley to ship in corn and compete on even terms with Corn Belt feeders. The sugar-beet industry thus subsidizes the livestock feeding in a small way.

Demand for pasture land in the valley.—Most farmers in the valley consider their irrigated cropland to be too valuable for irrigated pasture. Although the validity of this assumption is subject to debate by both farm operators and agricultural technicians, the fact remains that only about 13,000 acres (or 3 per cent) of the cropland was in irrigated pasture in 1946. In addition, about 370,000 acres of sub-irrigated and seeped land in the valley were available for pasture, the grazing capacity of which ranges from little more than nothing in some cases up to nearly that of irrigated cropland pasture in others. Although the total pasture acreage of the valley may seem large, the total grazing capacity, after allowance is made for needs of dairy cattle and general farm livestock, is enough for only a small fraction of the breeding stock that would be needed to raise all the feeders that are fed out annually in the valley. This means that the bulk of the feeder livestock must be raised on either adjacent or distant range areas.

The growing interest among farmers in the sandy areas of the Pathfinder district in putting land that is subject to erosion in alfalfa, brome, and other pasture crops has been mentioned. If this hay-and-pasture seeding program reaches the extent that agricultural technicians consider desirable, more stock cattle and feeders probably will be raised on irrigated land to utilize the forage. This increase in hay and pasture acreage, then, is likely to decrease the integration between the range areas and the valley, but only to a very limited degree because the number of feeder cattle that can be raised here compared with the total number of feeder livestock required in the valley is very small.

Demand for feed in the valley.—The valley is very definitely a feed-deficit area. Thousand of tons of corn must be shipped in annually. This situation creates a ready market at good prices for any feed raised on the surrounding dry lands. The consensus among the interviewed elevator operators is that corn prices in the North Platte Valley generally are Omaha prices plus freight of 31 cents per bushel. As a good deal of barley is normally shipped out of the valley, the barley price differential is not so great as in the case of corn and, on the average, local barley prices are just about the same as Omaha prices. Were it not for intensive feeding in the valley, the local corn and barley prices would be more nearly Omaha prices minus freight. In other words, dry-land farmers get 50 to 60 cents per bushel more for corn and 25 to 27 cents per bushel more for barley by virtue of the local feed market created by the heavy feeding operations in the valley. Wheat is the chief crop raised on dry land, of course; the local prices are Omaha prices minus freight and handling charges. Wheat prices rose much faster than feed-grain prices during the early years of the war, thus offsetting the price differentials which normally make it possible for corn and barley to compete with wheat; and a considerable acreage was shifted from feed crops to wheat. This indicates that if it were not for the local feed market, probably very little barley and corn would be raised on these tablelands.

Marketing customs and facilities.—As area integration in the valley depends largely on the exchange of livestock and livestock feed, the buyers and sellers must be brought together. The customs which have grown up and the marketing facilities that have been organized are influential in promoting smooth-functioning integration.

The bulk of the feeder lambs are bought by valley farmers and commercial feeding contractors under the customary lamb contracts with the sheepmen, each spring. Direct dealing is also a common method for acquiring feeder cattle, although the local sales rings are now more important. Before sales rings were

[5] Beet tops generally were sold at the farm for 75 to 90 cents per ton of beets harvested. At average analyses, the total digestible nutrients in 90 cents' worth of tops would cost 0.84 cents per pound. Alfalfa hay generally sold for around $16 in the stack, which is equivalent to 1.59 cents per pound of total digestible nutrients.

established in the late 1930's, the farmers who did not have contacts with ranchers commonly bought their feeder cattle through commission firms in Denver. The numbers of livestock handled by the local sales rings have grown steadily during the last decade and the importance of the rings to the local agricultural economy, both as a place for farmers to buy feeders and as a place to sell finished and partly finished livestock, can hardly be overestimated. For the irrigation farmers and the small dry-land operators, they provide a market for any kind of livestock at any season of the year, usually at prices in keeping with those of central markets. The packing plant at Gering, which buys finished livestock both direct from the farmers and through the sales rings, is also important in the local livestock marketing scheme.

Although there is some direct dealing in hay and grain between valley farmers and dry-land farmers, most of the feed exchange between the valley and the surrounding dry lands is through local elevators and feed dealers. Formerly, these concerns also handled most of the corn shipped into the valley, but direct-dealing truckers are now more important. Most of the truckers operate as hucksters, buying corn direct from the growers in central and eastern Nebraska and selling direct to the feeders in the valley. This marketing service is comparatively new and possibly will undergo modifications as time goes on. Some arrangements, for example, may be needed eventually for the determination of grade and moisture content.

Factors Hindering Area Integration

Independence of irrigation and dry-land agriculture.—One of the more basic factors tending to prevent full area integration is the essentially independent nature of agriculture within the irrigated farming, dry-farming, and ranching segments of the economy so far as individual operators are concerned. Very few of the ranchers, for example, have sought irrigated land in the valley to stabilize their grazing operations. Many of them have fairly stable units based on hay meadows right on their ranches. Many of the dry-land farmers raise little besides wheat and have practically no contact with farmers in the valley. Both dry-land farming and ranching, as practiced here, are basically sound types of agriculture, regardless of any stabilizing effect the irrigated valley may have.

Moreover, area integration based on buyer-seller relationships is not hard-and-fast, but is rather flexible because each type of operator has alternatives. An irrigation farmer has the choice of whether to feed, what crops to raise, what feeds to buy and from whom. If he decides to feed, he has several choices of type of livestock to feed, whether to raise his own feeders or to buy them and, if he buys feeder cattle, whether to buy from other valley farmers or from sales rings. A dry-land farmer has the alternative of raising only wheat or raising some feed as well. A local rancher has the choice of selling his feeders to Corn Belt buyers or to valley feeders. In fact, if he consigns his feeders to a sales ring, as many do, it is immaterial to him whether they are bought by a Valley feeder or by a contract buyer from the Corn Belt.

Valley preference for certain types of feeder stock.—Practically all types of sheep and cattle are fed out in the valley but certain types are preferred. Many feeders, for example, prefer lambs to cattle, and most cattle feeders prefer 2-year-olds or aged steers to calves and yearlings. Some of these preferences are based on personal likes and dislikes and on types of feed available.

Calves and yearlings apparently do not do as well on wet beet pulp as older animals and so only a few of the valley farmers feed out young stuff. At the same time, many of the nearby ranches are set up as cow-and-calf outfits or cow-and yearling outfits. Their owners like to sell the calves at weaning time and the yearlings in late August or early September when the range begins to be short. Some of the valley farmers who have available pasture will buy calves and yearlings this early in the season, but most feeders prefer to wait until after beet harvest before they fill their feedlots. There is a need, then, for a type of operator who is set up to carry young stuff for 3 to 15 months on pasture before they go into feedlots. A few dry-land and irrigation operators are getting into this business, but they can handle only a small percentage of the calves and yearlings now coming off the range each year. So a large number of cattle go from the surrounding range country into the Corn Belt, for baby-beef production, which otherwise might be held for 2-year-old beeves and aged steers in the North Platte Valley.

During the last 8 years, about 60 percent of the annual feeding capacity of the valley has been utilized for feeding sheep and lambs and only 40 percent for feeding cattle. As practically all of the feeder sheep and lambs come from central

Wyoming and other distant localities, it may be said that 60 percent of the feeding capacity of the valley is integrated with distant ranges. Were it not for this preference for feeder sheep over feeder cattle, some 80,000 to 90,000 head of local range cattle could be fed out in the valley each year instead of only 25,000 to 35,000 head, thus tying the economy of the surrounding range country more closely to that of the valley.

This heavy preference for sheep is due largely to the belief that an experienced feeder can make more profit with sheep than with cattle and that most of the feeder cattle from the surrounding ranges have gone to market 30 to 60 days before the time the valley feeders are ready to fill their feedlots. Because of the present situation in regard to pasture both in the valley and on the surrounding range, the feeding of sheep and lambs fits into the operations of many valley farmers better than does cattle feeding.

Unavailability of dry-land pasture to valley farmers.—Practically all of the range land surrounding the North Platte Valley is included within medium-sized to large ranches. Range land seldom can be bought except by buying out a complete ranch unit, the cost of which in recent years may run anywhere from $50,000 to $800,000, depending on acreage and other circumstances. Unlike many other areas in the Missouri Basin where there is excessive parcellation of land, very little range land is available in tracts of a section or less. Yet small tracts of grazing land are what many of the valley farmers would like to have and what they need for integrated operating units. The ownership pattern of the surrounding range area is one of the principal hinderances to a more direct tie-up between the range and the valley and explains why more integration must come about by buyer-seller relationships rather than by operating both types of land in the same unit.

One of the questions asked the 175 valley farmers was, "What do you consider as important advantages or disadvantages of operating land both dry and irrigated?" Some had no opinion on this question because they had had no experience with dry land. Some discussed the question in terms of dry-farming land only, and some in terms of dry-land pasture. Of the 175 operators, 93 (or 53 percent) expressed no opinion on operating dry pasture land in conjunction with irrigated farm land. Those who did answer were overwhelmingly (94 percent) in favor of this type of integration.

Of those who had dry-land pasture, several said emphatically that they simply could not operate their livestock farms without dry pasture and one tenant said he would not consider renting any irregated farm unless it contained either dry range or subirrigated land for pasture. The answers of those who did not have dry-land pasture indicated a great unfilled demand for range land. Some mentioned their unsuccessful attempts to get range and others expressed regret that practically all of the surrounding range land was "sewed up" within the large ranches and was unavailable in small tracts.

Several advantages of dry-land pasture were mentioned. Some operators spoke of its value in conjunction with their dairy enterprises, possibly for dry cows and young stock. Others were thinking of running stock cattle and raising their own feeders. Still other said that if they had range land they could buy range calves in late summer and "rough them through" for 15 months on dry pasture with only a minimum of supplemental feed, thus putting on a lot of cheap gain before the cattle were put into the feedlots. A few went a bit further by saying if they had dry-land pasture they could raise their own feeders and so would feed about the same number of cattle every year regardless of the prospective "feeding spread" in the fall.

Those who could see no advantage in dry-pasture land had no definite reasons for their opinions other than that their enterprizes did not call for it. Some of these were strictly cash-crop farmers who had no livestock, and so had no need for pasture. Others had operating units which contained subirrigated or seeped land for pasture.

The use of dry-land pasture in conjunction with irrigated land is not without its problems. For one thing, if this pasture is not located near the farmstead, there is the time required each week during the grazing season to run up to see if the cattle are all right, if the windmill is working properly, and if the fences are up. None of the operators commented directly on this inconvenience, but several of those favoring dry-land pasture seemed to assume it, because they qualified their answers by adding that the range would have to be conveniently located to their headquarters or they could not handle it.

A second possible problem of dry-land pasture integration is the high cost per head of fencing the range and developing water for a small number of cattle. None of those interviewed mentioned these costs, yet they are among the first

things a genuine range operator would consider when buying a tract of range land. There is a possibility that if the irrigated farmer would add up all costs of raising his own feeders on grazing land—including interest on the investment in land, fencing and water developments—he might find it cheaper over the long run to buy his feeders from the large, more efficient range outfits.

High percentage of tenancy in the valley.—The problems of landlord-tenant relations, which stem from the high percentage of tenancy on irrigated farms, tend to hinder area integration. More than half of the surveyed operators are full tenants and an additional 10 percent are part owners (table 29). The rate of tenancy varies considerably from one part of the valley to another. Only 36 percent of the surveyed operators in the Goshen district are tenants, compared with 61 percent in the Gering-Fort Laramie district. In some communities in the latter district, tenancy seems to be in excess of 75 percent, and under one of the large private canals in the valley, more than 90 percent of the land is corporate-owned and tenant-operated.

Then tenancy rate has been increasing steadily for many years. The rate for Scottsbluff County (over 90 percent of the operating units in this county are irrigated farms) increased from 53.4 percent in 1930 and 54.3 percent in 1935, to 55.8 percent in 1940, and 57.3 percent in 1945.[6] The rate among irrigated farms is somewhat higher than for all farms in this county. In 1940 the latest year for which separate tenancy figures are available for irrigated farms, 58.1 percent of the irrigated farms were tenant-operated compared with the county average of 55.8 percent.

The increase in tenancy, according to local informants, is due largely to the purchase of farms by local business and professional men for long-term investment purposes. This belief is borne out by the fact that comparatively few nonresidents were noted among the landlords of either the survey farms or of the lists of farm units from which the sample was drawn. In compiling these lists from records of the irrigation districts, it was noted that a good many local business and professional men owned two to four farms each. It was also noted that only one land-investment company has been active recently in buying up farms to lease to operators.

A common complaint among the interviewed tenants is that local investment buyers are acquiring the best land. The survey tends to bear this out. Thirty percent of the tenant-operated land is in class 1, while only 17 percent of the owner-operated land is in this class (table 30). Fifty-five percent of the tenant-operated land is in classes 1 and 2, compared with only 35 percent of the owner-operated land. Yields of sugar beets, the one crop for which accurate yield figures are available, are significantly higher on tenant-operated farms than on owner-operated farms in all three districts surveyed, the average yield on tenant-operated land being nearly 9 percent higher than on owner-operated farms (table 31).

A high percentage of tenancy in the area plus the fact that a large proportion of the land is held by owners who are unwilling to sell, means that competition among tenants for the better farms is very keen. Agriculture in this valley is highly mechanized and is becoming increasingly so, so the first requirement of a tenant is to have a complete line of up-to-date machinery. A tenant must replace his equipment with new machines much faster than does an owner-operator. The minimum value of machinery that tenants now need is not far from $10,000. Continued reinvestment in this operating capital keeps the tenant "machinery poor" and makes it difficult for him to accumulate enough cash to make a down-payment on land.

One of the undesirable attributes of tenancy frequently mentioned is that it discourages livestock operations and a balanced system of farming. This is not exactly true in the North Platte Valley. Forty-four percent of the tenants fed out livestock during the 1946–47 season, compared with 41 percent of the owner-operators (table 32). In the Goshen and Gering-Fort Laramie districts, the percentage of livestock feeders was much higher among tenants than among the owner-operators.

Livestock operations of tenants, however, generally are on a smaller scale than is the case with owner-operators. Tenants do not handle nearly their proportionate share of hogs and, on the average, their sheep-feeding enterprises are only about two-thirds as large as those of owner-operators (table 33). As cattle feeders, however, tenants are almost on a par with owner-operators.

[6] Data from U. S. Census of Agriculture.

Many tenants are able to feed cattle or sheep in the valley because their landlords, who appreciate the value of manure, enter into feeding agreements with them. Some of these landlord-tenant feeding contracts are similar to those used by the commercial feeding contractors and others are virtually partnership agreements. This custom tends to promote more livestock feeding among tenants than would otherwise be the case.

But there are several ways in which a high percentage of tenancy discourages livestock feeding. Landlords apparently are more acutely conscious of prices and prospective feeding spreads than are farm operators. Several of the tenants said the reason they didn't feed livestock during the 1946–47 season was that their landlords, fearing the possibility of an unfavorable feeding spread, refused to finance the feeding.

Part of the difference between owner-operators and tenants in livestock operations is due to differences in type of land. As investing landlords have preferred the higher classes of land, the tenant-operated farms contain less seeped, subirrigated, and other land that can be used for pasture. On the owner-operated farms, 15 percent of the water-right acreage is in tame and native pasture; on tenant farms, only 7 percent. This difference is especially noticeable in the Gering-Fort Laramie district, where 16 percent of the land in owner-operated farms is in pasture, compared with only 2 percent of that in tenant-operated farms.

Neither group of operators has very much land in tame pasture. Owner-operators have 5 percent of their irrigated cropland in tame pasture, while tenants have less than 2 percent. About 50 percent of the cropland on tenant-operated farms is in beets, beans, and potatoes, while only 40 percent of the cropland on owner-operated farms is in these cash crops.

About 20 percent of the cropland is in alfalfa on both owner-operated and tenant-operated farms, but owner-operators have a higher proportion of their cropland in feed and forage crops other than alfalfa. Fifty-six percent of the owner-operators and 41 percent of the tenants have the use of dry-land pasture. In the case of tenants, the dry-land pasture generally is the incidental, non-irrigable parts of the tracts comprising the leaseholds. The uncertainty of length of tenure on an irrigated farm makes it exceedingly risky for a tenant to acquire a tract of dry-land pasture of his own. Unless the farm includes considerable subirrigated or dry-land pasture, a tenant is practically barred from such enterprises as dairying and raising feeders. Feedlot fattening, then, is the most practical livestock enterprise for most tenants.

Nineteen percent of the barley produced on owner-operated farms and 15 percent of that produced on tenant-operated farms was sold or fed off the farm in 1946–47. In the case of all other feeds, however, the proportion sold or fed off the farms was much higher on tenant-operated farms.

Feed	Owner-operated farms	Tenant-operated farms
	Percent	*Percent*
Corn	9	28
Oats	9	24
Alfalfa	8	27
Other hay	0	43
Beet tops	0	10

The loss of feed from tenant-operated farms in many instances was due to the landlords taking their share to other farms for feeding. A few tenants said the reason they didn't feed more livestock was because their landlords wouldn't sell them the rental shares of the feed grown.

Probably the most important way in which tenancy affects livestock feeding is the common dislike of many landlords to spend much money for improvements. Several tenants said that the reason they could not feed was that their landlords refused to put in the necessary feedlots and stock-water facilities.

Lack of capital for feeding.—The large operators generally seem able to obtain the financing for feeding operations, but both small owner-operators and tenants are handicapped by a lack of capital at reasonable interest rates to finance their feeding. This is one of the reasons for the poor distribution among farm operators of the numbers of livestock fed out. This is especially noticeable during a period when feed and feeder prices are high, as in 1946 and 1947. With

feed and feeder prices that prevailed in the late fall of 1946, for example, it would take between $7,600 and $8,000 in feed and lambs to feed out only 500 head. Many small operators naturally hesitate to take the risk of feeding, especially when they have to pay 8- to 10-percent interest on short-term loans. They either curtail the numbers of livestock fed or do not feed at all. Local informants mentioned one of the local banks which has been carrying on a rather successful feeding-finance program at reasonable interest rates, which apparently is rather unusual for commercial banks in this area. If this program is as successful as reported, other financial institutions may eventually try them and the local credit situation would then improve.

Lack of feeding experience and aptitude.—Many of the operators, both tenants and owners, simply do not care to work with livestock and do not want any, except for small poultry flocks. Successful livestock enterprises, and especially livestock feeding, require considerable experience. Many operators, either because they dislike livestock or because they are not venturesome, hesitate to take the risks incident to feeding in order to gain this experience.

Operator's time and machinery.—The conflicts regarding the operator's time and the differences in the machinery required for dry land and for irrigation make certain types of integrated dry and irrigated farming impracticable. This is indicated by the answers of operators relative to the advantages and disadvantages of operating both dry land and irrigated land. Unlike the answers regarding dry-land pasture, which were overwhelmingly in favor of integration, there was a sharp division of opinion with regard to the advantages of integration with dry-farming land. Nearly twice as many gave advantages for dry-farming integration as gave disadvantages but the significance of this must be discounted heavily because nearly two-thirds of the operators expressed no opinion on this matter.

Of the 23 operators with dry-farming land who commented on this type of integration, 9 could see no advantages in it. They were merely utilizing the dry-farming land within their respective units because it was there and would go to waste if not used. One said that if he had enough irrigated cropland to supply his feed, he "wouldn't fool around with dry farming." Another regretted that he had broken out the dry land in his unit; he now thinks this land might have been more valuable to him if he had kept it in dry pasture. The other 14 operators with dry-farming land were just as emphatic on the merits of dry farming in conjunction with irrigation.

Of the 37 operators without dry-farming land who commented on integration, 12 could see no advantage in adding a dry-farming enterprise to their irrigated units. Several said that formerly they had been dry-land farmers, but that they wanted to have nothing more to do with it. On the other hand, 25 said that dry farming would fit into their irrigation farming very nicely. Their opinions, of course, may have been biased somewhat by the fact that dry-land operators generally have been very successful since 1940, the last year of bad drought.

Several clear-cut disadvantages to the integration of irrigation farming and dry farming are apparent. In the first place, production from dry land is uncertain. If a farmer so organizes his entire operation that he depends heavily on production from dry land for feed, sooner or later he will be forced to make drastic changes on account of drought. Second, dry-land crops conflict with irrigated crops for the operator's time. Plowing on both dry land and irrigated land must be done at about the same time, summer-fallowing dry land usually must be done during the peak of the irrigation season, and wheat seeding comes right in the middle of the bean harvest. Third, most of the machinery on the average irrigated farm does not fit large-scale dry farming. Some of the irrigated farms do not have a tractor big enough to pull a wheatland plow (one-way disk plow) on dry land. Most irrigated farms are equipped with a small grain drill, whereas effective dry farming requires a large furrow drill. Most irrigated farmers bind and thrash their grain so as to save all the straw and chaff, whereas efficient dry farming requires a large combine.

The advantages of integration listed by the farm operators are diametrically opposed to the disadvantages discussed above: (1) Dry land produces straw and feed for feedlot operations, thus releasing more of the irrigated land for cash crops or reducing the amount of straw and grains that must be bought; and (2) operating both dry and irrigated land results in better utilization of the operator's time, several integrated operators enthusiastically described in detail their seasonal work plan. It is possible that these men were better-than-average managers which make them successful in maintaining these work schedules.

At first glance the advantages and disadvantages listed by the farmers appear to be contradictory but an examination of the individual schedules seems to indicate that the operators were talking about two different kinds of integration between irrigated farming and dry farming. Those stressing the disadvantages generally were thinking about large-scale wheat operations, while those stressing advantages were thinking about small-scale, dry-land barley as a more or less incidental enterprise to their main busines of irrigation farming. It would seem that alternate barley and summer fallow on not more than 320 acres of dry land, located conveniently to the irrigated land, works out satisfactorily for the experienced operator. This acreage can be plowed, summer-fallowed, seeded, and The principal requisites are better-than-average managerial ability and a few "breaks" with respect to the weather.

Size and shape of irrigated area.—Nearness and convenience of location of dry land with respect to irrigated land affects the practicability of combining both types of land in the same operating unit. This survey showed that most of the integrated units are those lying along the main canals of the project, adjacent to the dry land. The over-all size and shape of the irrigated area, therefore, is seen to have an important bearing on the extent and type of integration with adjoining areas.

In a long, narrow irrigation project of 10,000 to 50,000 acres, for example, a much greater percentage of the operating units would be adjacent or close to dry land than is the case in the North Platte Valley, where the total irrigable land is more than 400,000 acres and the width of the irrigated area ranges up to 18 miles. In smaller, narrower projects, under conditions similar to those existing in the North Platte Valley, a larger proportion of the irrigated farms would be expected to be tied in physically with the adjoining dry-land tracts than was found to be the case in this study.

Statistical Tables

(All tables are based on data collected through survey of 175 farm operators in North Platte Valley, unless otherwise noted)

TABLE 1.—*Irrigable and irrigated acreages in North Platte Valley, by irrigation enterprises, 1946*

Enterprise	Canal	State	Practical irrigable acreage [1]	Irrigated cropland [2]
			Acres	*Acres*
Repayment contractors:				
Pathfinder irrigation district [3]	Interstate	Wyoming	2,300	1,338
Do.[3]	do	Nebraska	95,700	84,699
Goshen irrigation district	Fort Laramie	Wyoming	50,000	41,113
Gering-Fort Laramie irrigation district.	do	Nebraska	53,500	50,031
Northport irrigation district	Northport (via Tri-State)	do	13,000	9,341
Total			214,500	186,522
Warren Act contractors:				
Lingle Water Users Association	Interstate	Wyoming	10,300	10,090
Hill irrigation district	do	do	3,500	
Lincoln Land Co.[4]	Rock Ranch	do	4,016	[5] 3,916
Gering irrigation district	Mitchell-Gering	Nebraska	13,500	11,630
Farmers irrigation district	Tri-State	do	[6] 52,300	[7] 50,903
Central irrigation district	Central	do	1,598	1,380
Chimney Rock irrigation district	Chimney Rock	do	5,000	4,310
Brown's Creek irrigation district	Brown's Creek	do	[8] 6,190	5,330
Beerline Canal Co	Beerline	do	[8] 2,043	1,760
Total			98,447	89,319
Water-rental contractors, 1946:				
Lucerne Canal & Power Co	Lucerne	Wyoming	4,221	3,640
Partnership	Burbank	do	312	[5] 262
Grattan Ditch Co	Grattan	do	1,323	1,140
Torrington irrigation district	Torrington	do	2,061	1,780
French Ditch Irrigation Co	French	do	651	560
Do	do	Nebraska	1,025	880
Mitchell irrigation district	Mitchell-Gering	do	13,633	11,740
Total			23,226	20,002

See footnotes at end of table.

TABLE 1.—*Irrigable and irrigated acreages in North Platte Valley, by irrigation enterprises, 1946*—Continued

Enterprise	Canal	State	Practical irrigable acreage [1]	Irrigated cropland [2]
			Acres	*Acres*
Independent enterprises, North Platte River:				
New North Platte Irrigation & Ditch Co.	North Platte	Wyoming	3,153	2,720
Partnership	Narrows	do	110	[9] 110
Wright and Murphy lands	Fort Laramie	do	210	[9] 210
Partnership	Pratt and Ferris	do	1,200	1,030
Enterprise irrigation district	Enterprise	Nebraska	5,534	4,770
Ramshorn irrigation district [10]	Ramshorn	do	994	860
Minatare Mutual Canal & Irrigation Co.	Minatare	do	6,910	5,950
Winters Creek Canal Co	Winters Creek	do	4,494	3,870
Castle Rock irrigation district	Castle Rock	do	6,000	5,170
Nine Mile irrigation district	Nine Mile	do	5,000	4,310
Short Line irrigation district	Short Line	do	2,710	2,330
Alliance irrigation district	Alliance	do	3,900	3,360
Bridgeport irrigation district	Belmont	do	8,312	7,160
Empire Canal Co	Empire (via Belmont)	do	1,500	1,290
Logan Irrigation Co	Logan	do	178	155
Total			50,205	43,295
Independent enterprises, Horse Creek:				
Goshen Hole Water Users Association.	Springer	Wyoming	[8] 1,972	1,700
Horse Creek conservation district	Hawk Springs	do	[8] 10,214	8,800
Yoder irrigation district	Goshen	do	[8] 1,969	1,700
Partnership [11]	State Line	Nebraska	[8] 740	640
Total			14,895	12,840
Independent enterprises, Pumpkinseed Creek:				
Court House Rock Irrigation Co	Court House Rock	Nebraska	[8] 1,508	1,300
Private individual	Meredith-Ammer	do	[8] 435	380
Partnership	Last Chance	do	[8] 442	380
Total			2,385	2,060
Recapitulation:				
Lands in Wyoming			97,512	80,109
Lands in Nebraska			306,146	273,929
Total, North Platte Valley			403,658	354,038

[1] Unless otherwise specified, the figures in this column are those given as acreage entitled to receive water by the special master's report for the North Platte case (*Nebraska* v. *Wyoming*, et al., 325 U. S. 589, 65 S. Ct. 1332). In most instances, the special master's estimate is somewhat less than the "irrigable" acreage reported by the U. S. Army Corps of Engineers in Platte River, Colo., Wyo., and Nebr. (H. Doc. No. 197, 73d Cong., 2d sess., Jan. 3, 1934) and less than the adjudicated acreage, as determined by the State water authorities of Wyoming and Nebraska.

[2] Data for the four repayment contractors, Lingle Water Users Association, and Hill irrigation district, are from the 1946 annual crop census taken by these districts. Unless otherwise noted, data for the other enterprises are estimates, based on the average ratio between acreage irrigated in 1946 and the special master's irrigable acreage figure for the six enterprises listed above. In all cases, an attempt was made to eliminate acreage of native pasture, to which ditch water is seldom applied.

[3] Includes nonconsenting lands, which are excluded from the district, but for which the district acts as fiscal agent of the U. S. Government.

[4] Only 844 acres are under Warren Act contract.

[5] Acreage reported as irrigated in 1946 to the project engineer of North Platte project.

[6] Includes 3,041 acres of preferred-right lands, excluded from the district, but to which the district must deliver direct-flow water by virtue of its right-of-way deed. Preferred-right lands do not receive storage water under the Warren Act contract.

[7] From unpublished report on this enterprise, prepared by Stanley W. Voelker of U. S. Bureau of Agricultural Economics, March 1947. This figure includes 2,808 acres of preferred-right lands.

[8] Acreage entitled to water not determined by special master because enterprise was not involved in the interstate apportionment of water. Figure given is adjudicated and/or acreage under permit.

[9] Special master's estimate apparently eliminated most, if not all, of the native-pasture lands, and hence his estimate was not adjusted to determine acreage actually irrigated.

[10] Enterprise partially inoperative.

[11] Includes data for Gilmore Ditch Association.

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TABLE 2.—*Distribution of crop acreages on the 175 farms surveyed and on all farms in the North Platte reclamation project, 1946*

Type of crop and land use	175 sample farms [1]		North Platte project [2]	
	Acres	*Percent*	*Acres*	*Percent*
Irrigated cropland:				
Corn and cereals:				
Barley	3,454	17.1	30,549	16.4
Corn	809	4.0	10,368	5.6
Oats	760	3.8	6,584	3.6
Other grain	83	.4	2,628	1.4
Total	5,106	25.3	50,129	27.0
Hay and forage:				
Alfalfa hay	4,232	20.9	35,190	18.9
Other hay	332	1.6	3,411	1.8
Fodder and silage	192	1.0	1,092	.6
Total	4,756	23.5	39,693	21.3
Cash row crops:				
Beans	4,337	21.4	44,446	23.9
Potatoes	1,728	8.5	17,294	9.3
Sugar beets	3,404	16.8	26,430	14.2
Truck and canning crops	131	.7	767	.4
Other	20	.1	122	.1
Total	9,620	47.5	89,059	47.9
Tame pasture	629	3.1	6,935	3.7
Soild building, new seeding, hay and pasture	113	.6	219	.1
Total	742	3.7	7,154	3.8
Total irrigated	20,224	100.0	186,035	100.0
Native pasture [3]	1,748		15,548	
Farmsteads, rights-of-way, etc	706		8,235	
Idle and fallow [4]	674		28,030	
Grand total	23,352		237,848	

[1] Annual crop census data for 10 percent sample of Goshen, Gering-Fort Laramie, and Pathfinder irrigation districts.

[2] Annual crop census for Goshen, Gering-Fort Laramie, Northport, and Pathfinder irrigation districts, including the unorganized and nonconsenting lands under the Interstate canal.

[3] Mainly seeped and subirrigated pasture land.

[4] Mostly undeveloped class 5 land.

TABLE 3.—*Crop distribution on farms in North Platte reclamation project, selected years, 1934–46*

Type of crop and land use	1934	1936	1938	1940	1941
Irrigated cropland:					
Corn and cereals:	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
Barley	17,251	17,157	18,257	21,820	20,802
Corn	20,038	24,117	29,637	31,424	33,258
Oats	13,493	17,217	13,946	8,440	9,995
Other grain	2,665	1,630	2,431	3,565	4,530
Total	53,447	60,121	64,271	65,249	68,585
Hay and forage:					
Alfalfa hay	36,517	37,382	30,867	24,178	30,204
Other hay	3,995	3,826	4,953	7,353	5,322
Fodder and silage	7,494	1,734	2,724	3,886	2,852
Total	48,006	42,942	38,544	35,417	38,378
Cash row crops:					
Beans	7,085	6,742	14,292	16,773	20,978
Potatoes	20,310	18,546	20,057	22,445	19,646
Sugar beets	36,043	38,954	37,550	31,620	28,175
Truck and canning crops	631	883	1,518	1,142	1,336
Other	665	239	430	362	313
Total	64,734	65,364	73,847	72,342	70,448
Other:					
Tame pasture	3,298	3,958	2,282	2,097	3,409
Soil building, new seeding, hay, and pasture	595	1,052	1,377	1,294	1,211
Total	3,893	5,010	3,659	3,391	4,620
Total irrigated	170,080	173,437	180,321	176,399	182,031
Native pasture [1]	5,905	9,103	13,499	12,921	14,643
Farmsteads, rights-of-way, etc		6,189	6,628	7,695	7,806
Idle and fallow [2]	59,618	45,875	36,015	39,433	31,963
Grand total	235,603	234,604	236,463	236,448	236,443

Type of crop and land use	1942	1943	1944	1945	1946
Irrigated cropland:					
Corn and cereals:	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
Barley	17,981	21,009	23,738	24,938	30,549
Corn	21,770	18,123	18,076	13,480	10,368
Oats	8,907	7,301	6,832	7,345	6,584
Other grain	3,841	3,382	3,446	2,912	2,628
Total	52,499	49,815	52,092	48,675	50,129
Hay and forage:					
Alfalfa hay	36,911	36,738	38,424	35,203	35,190
Other hay	3,708	2,983	2,690	2,645	3,411
Fodder and silage	1,493	2,042	3,515	1,077	1,092
Total	42,112	41,763	44,629	38,925	39,693
Cash row crops:					
Beans	28,595	45,295	41,117	37,902	44,446
Potatoes	17,949	19,771	19,261	18,150	17,294
Sugar beets	37,069	21,378	25,663	28,497	26,430
Truck and canning crops	1,341	1,151	906	807	767
Other	246	144	133	137	122
Total	85,200	87,739	87,080	85,493	89,059
Other:					
Tame pasture	5,281	5,034	3,073	5,240	6,935
Soil building, new seeding, hay, and pasture	724	572	238	342	219
Total	6,005	5,606	3,311	5,582	7,154
Total irrigated	185,816	184,923	187,112	178,675	186,035
Native pasture [1]	14,037	13,828	9,744	12,152	15,548
Farmsteads, rights-of-way, etc	7,971	8,395	7,494	8,834	8,235
Idle and fallow [2]	28,687	29,326	34,191	32,924	28,030
Grand total	236,511	236,472	238,541	232,585	237,848

[1] Mainly seeped and subirrigated pasture lands.
[2] Mostly undeveloped class 5 lands.

Source: Annual crop census for the Goshen, Gering-Fort Laramie, Pathfinder, and Northport irrigation districts.

TABLE 4.—*Number of livestock on farms in North Platte reclamation project, selected years, Jan. 1, 1934–47*

Year	Cattle				Sheep		All hogs and pigs	Horses and mules
	Dairy stock [1]	Beef stock [1]	Sires	Feeders [2]	Farm flock	Feeders [3]		
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
1934	10,582	7,843	436	11,063	4,578	129,375	13,244	8,310
1936	11,087	9,551	274	20,806	1,766	244,372	7,724	7,702
1938	11,113	5,274	321	15,475	3,490	274,872	8,512	7,642
1940	9,431	4,312	193	17,219	3,931	210,036	13,438	6,741
1941	9,123	4,630	239	15,560	3,670	178,770	11,186	6,428
1942	9,555	6,008	196	13,563	6,114	230,548	12,001	5,892
1943	10,706	6,543	204	11,301	6,429	211,267	19,566	6,026
1944	12,264	9,298	310	10,126	4,685	164,979	31,664	5,531
1945	12,003	7,841	508	15,982	5,349	175,092	10,040	4,848
1946	10,712	9,291	371	14,385	3,744	180,812	10,193	4,268
1947	8,832	8,988	532	13,310	3,125	155,807	7,025	3,185

[1] Includes calves and yearlings.
[2] Includes calves, heifers, and cows as well as steers.
[3] Includes old ewes, as well as lambs.

Source: Annual project histories of North Platte reclamation project.

TABLE 5.—*Number of sheep and cattle on feed and number of hogs in North Platte Valley, Jan. 1, 1934–47*

Year	On feed		All hogs and pigs
	Sheep and lambs	Cattle and calves	
	Number	*Number*	*Number*
1931	310,000	23,230	92,380
1932	385,000	17,890	106,810
1933	405,000	21,220	74,980
1934	330,000	19,060	70,090
1935	395,000	13,370	31,810
1936	445,000	36,240	35,680
1937	325,000	29,500	34,910
1938	475,000	34,220	29,000
1939	380,000	31,300	32,640
1940	424,400	36,120	51,800
1941	345,000	35,320	44,350
1942	430,000	55,190	46,960
1943	405,900	40,090	85,300
1944	406,610	36,890	97,480
1945	383,400	43,330	47,480
1946 [1]	426,000	50,470	31,250
1947 [1]	277,900	42,900	23,430

[1] Preliminary.

Source: Based on county estimates of State and Federal Crop Reporting Service, Lincoln, Nebr., and Cheyenne, Wyo.

TABLE 6.—*Use of land in North Platte Valley, by type of irrigated farm, 1946*

Type of farm	Farms surveyed		Land in farms					
			Cropland		Dry pasture		Other	Total
			Irrigated [1]	Dry	Irrigated [2]	Dry		
Surveyed farms with—	*Number*	*Percent*	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
No dry cropland or dry pasture	83	47.4	9,024	-------	1,122	-------	479	10,625
No dry cropland but with dry-land pasture	54	30.9	6,036	-------	874	10,263	258	17,431
Dry cropland but no dry-land pasture	14	8.0	2,681	656	314	-------	109	3,760
Dry cropland and dry pasture	24	13.7	2,528	2,802	67	18,571	162	24,130
Total	175	100.0	20,269	3,458	2,377	28,834	1,008	55,946

[1] This column includes 674 acres of idle and fallow cropland shown in table 2.
[2] All pasture land with water rights; a large part is subirrigated or seeped to which ditch water is seldom applied. Also included are 629 acres of tame pasture which is included with cropland in table 2.
[3] Farmsteads, rights-of-way, ditches, and waste land.

TABLE 7.—*Extent of integration of irrigated farming with dry-land farming in North Platte Valley, 1946*

Extent of use of dry-land pasture	Farms by districts							
	All districts		Goshen		Gering-Fort Laramie		Pathfinder	
Surveyed farms:								
Dry-land farming:	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Dry farm land adjacent to home farm:								
Below main canal	18	10.3	-------	-------	8	18.2	10	11.3
Above main canal	11	6.3	4	9.5	6	13.6	1	1.1
Dry farm land nonadjacent to home farm:								
Below main canal	3	1.7	1	2.4	1	2.3	1	1.1
Above main canal	6	3.4	4	9.5	2	4.5	-------	-------
Total dryland farming	38	21.7	9	21.4	17	38.6	12	13.5
No dry-land farming	137	78.3	33	78.6	27	61.4	77	86.5
Total surveyed farms	175	100.0	42	100.0	44	100.0	89	100.0

TABLE 8.—*Extent of integration of irrigated farming with dry-land pasture in North Platte Valley, 1946*

Extent of use of dry-land pasture	Farms by districts							
	All districts		Goshen		Gering-Fort Laramie		Pathfinder	
Surveyed farms with:								
Dry-land pasture:	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Adjacent to home farm:								
Below main canal	43	24.6	6	14.3	11	25.0	26	29.2
Above main canal	22	12.6	8	19.0	5	11.4	9	10.1
Nonadjacent to home farm:								
Below main canal	5	2.9	1	2.4	1	2.3	3	3.4
Above main canal	8	4.5	5	11.9	2	4.5	1	1.1
Total with dry-land pasture	78	44.6	20	47.6	19	43.2	39	43.8
No dry-land pasture	97	55.4	22	52.4	25	56.8	50	56.2
Total surveyed farms	175	100.0	42	100.0	44	100.0	89	100.0

TABLE 9.—*Methods used by valley farm operators to obtain dry-land pasture, 1946*

Method	Operators by districts							
	All districts		Goshen		Gering-Fort Laramie		Pathfinder	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Operators using dry-land pasture: [1]								
Ownership	5	2.9	5	11.9				
Ownership and lease	1	.6			1	2.3		
Lease	2	1.1			1	2.3	1	1.1
Agistor contract [2]	26	14.8	7	16.7	7	15.9	12	13.5
Total	34	19.4	12	28.6	9	20.5	13	14.6
Total surveyed operators	175	100.0	42	100.0	44	100.0	89	100.0

[1] Dry-land pasture above main canals only.
[2] Method of hiring pasture on basis of specified fee per head of livestock per month.

TABLE 10.—*Kind of livestock operation undertaken by farm operators in North Platte Valley, May 1, 1946, to May 1, 1947*

Kind of livestock operation	Farm operators by districts							
	All districts		Goshen		Gering-Fort Laramie		Pathfinder	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Surveyed farms:								
Farms with livestock:								
General-farm livestock herds:								
Mixed farm herd	19	10.9	6	14.3	3	6.8	10	11.3
Farm dairy	48	27.4	5	11.8	10	22.8	33	37.1
Cattle trader	2	1.1	1	2.4			1	1.1
Livestock raising:								
Stock sheep	1	.6	1	2.4				
Stock cattle	25	14.3	10	23.8	1	2.3	14	15.7
Livestock feeding:								
Cattle	45	25.7	9	21.4	18	40.9	18	20.2
Sheep	14	8.0	6	14.3	6	13.6	2	2.3
Cattle and sheep	8	4.6	2	4.8	2	4.5	4	4.5
Hogs	2	1.1	1	2.4			1	1.1
Livestock raising and feeding:								
Cattle	1	.6	1	2.4				
Cattle and sheep	1	.6					1	1.1
Total	166	94.9	42	100.0	40	90.9	84	94.4
Farms with no livestock	9	5.1			4	9.1	5	5.6
Total surveyed farms	175	100.0	42	100.0	44	100.0	89	100.0

TABLE 11.—*Number of livestock handled by farm operators in North Platte Valley by kind of livestock operation, May 1, 1946, to May 1, 1947*

Kind of livestock operation	Cattle		Sheep		Hogs	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*
General farm livestock herds:						
Mixed farm herd	299	4.7	65	0.2	319	29.9
Farm dairy	529	8.3			164	15.3
Cattle trader	58	.9			31	2.9
Livestock raising:						
Stock sheep			1,600	3.8		
Stock cattle	1,261	19.7	10	(1)	79	7.4
Livestock feeding:						
Cattle	3,406	53.2	23	.1	132	12.3
Sheep	75	1.2	31,485	74.9	29	2.7
Cattle and sheep	584	9.1	8,475	20.2	44	4.1
Hogs	5	.1	8	(1)	193	18.1
Livestock raising and feeding:						
Cattle	62	1.0				
Cattle and sheep	117	1.8	359	.8	78	7.3
Total	6,396	100.0	42,025	100.0	1,069	100.0

[1] Less than 0.05 percent.

TABLE 12.—*Number of livestock handled by farm operators in North Platte Valley, by size of operation, May 1, 1946, to May 1, 1947*

Size of operation	Cattle				Sheep				Hogs			
	Operators		Handled		Operators		Handled		Operators		Handled	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Operators handling livestock:												
Under 20 head	74	42.3	612	9.6	5	2.9	66	0.2	59	33.7	335	31.3
20 to 39	35	20.0	1,036	16.2	----	----	----	----	8	4.6	205	19.2
40 to 79	37	21.1	1,870	29.2	1	.6	40	.1	7	4.0	386	36.1
80 to 159	9	5.1	1,228	19.2	1	.6	150	.4	1	.6	143	13.4
160 to 499	5	2.9	910	14.2	2	1.1	571	1.4	----	----	----	----
500 to 999	1	.6	740	11.6	8	4.5	5,513	13.1	----	----	----	----
1,000 to 1,999	----	----	----	----	9	5.1	12,535	29.8	----	----	----	----
2,000 and over	----	----	----	----	4	2.3	23,150	55.0	----	----	----	----
Total	161	92.0	6,396	100.0	30	17.1	42,025	100.0	75	42.9	1,069	100.0
Operators with no livestock	14	8.0	----	----	145	82.9	----	----	100	57.1	----	----

TABLE 13.—*Number of operators in North Platte Valley obtaining feeder cattle and sheep, by major source of livestock, May 1, 1946, to May 1, 1947*

Major source of feeder livestock	Operators, by kind of livestock obtained			
	Cattle		Sheep	
	Number	*Percent*	*Number*	*Percent*
Raised own feeder stock	2	3.6	----	----
From other valley farmers	2	3.6	----	----
From local sales rings [1]	33	60.1	4	17.4
From distant sales rings [2]	2	3.6	----	----
From contract feeders	5	9.1	1	4.3
From local ranchers (within 50 miles)	6	10.9	1	4.3
From distant ranchers (beyond 50 miles)	4	7.3	16	69.7
From distant States [3]	1	1.8	1	4.3
Total	55	100.0	23	100.0

[1] Torrington, Wyo., and Gering and Scottsbluff, Nebr.
[2] Lusk, Wyo.; Alliance, Nebr.; and Denver, Colo.
[3] Montana, Arizona, New Mexico, and Texas.

TABLE 14.—*Number of feeder cattle and sheep obtained by farm operators in North Platte Valley, by source of livestock, from May 1, 1946, to May 1, 1947*

Source of livestock	Cattle		Sheep	
	Number	*Percent*	*Number*	*Percent*
Stock raised by operators	66	1.8	42	.1
From other valley farmers	47	1.3	112	.3
From local sales rings [1]	1,648	44.9	1,067	2.6
From distant sales rings [2]	327	8.9	----	----
From contract feeders	184	5.0	3,000	7.4
From local ranchers (within 50 miles)	562	15.3	663	1.6
From distant ranchers (beyond 50 miles)	469	12.8	33,895	84.3
From distant States [3]	365	10.0	1,500	3.7
Total	3,668	100.0	40,279	100.0

[1] Torrington, Wyo.; and Gering and Scottsbluff, Nebr.
[2] Lusk, Wyo.; Alliance, Nebr.; and Denver, Colo.
[3] Montana, Arizona, New Mexico, and Texas.

TABLE 15.—*Number of livestock marketed by farm operators in North Platte Valley, by kind of livestock and market outlet, May 1, 1946, to May 1,1947*

Kind of livestock and market outlets	Livestock marketed							
	All districts		Goshen		Gering-Fort Laramie		Pathfinder	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Cattle sold to—								
Other valley farmers	104	3.0	7	.6	26	2.8	71	4.9
Local ranchers	53	1.5			10	1.1	43	2.9
Local sales rings [1]	1,003	29.3	221	21.1	109	11.9	673	46.0
Distant sales rings [2]	18	.5					18	1.2
Local packing company	536	15.7	96	9.2	112	12.3	328	22.5
Central markets	1,708	50.0	723	69.1	656	71.9	329	22.5
Total	3,422	100.0	1,047	100.0	913	100.0	1,462	100.0
Sheep sold to—								
Other valley farmers	927	2.5	850	10.5			77	1.1
Local ranchers								
Local sales rings [1]	3,564	9.7			260	1.2	3,304	45.2
Distant sales rings [2]								
Local packing company	7,712	21.0			7,712	36.3		
Central markets	24,449	66.8	7,213	89.5	13,302	62.5	3,934	53.8
Total	36,652	100.0	8,063	100.0	21,274	100.0	7,315	100.0
Hogs sold to—								
Other valley farmers	73	13.0					73	16.0
Local ranchers								
Local sales rings [1]	237	42.2			39	100.0	198	43.3
Distant sales rings [2]								
Local packing company	252	44.8	66	100.0			186	40.7
Central markets								
Total	562	100.0	66	100.0	39	100.0	457	100.0

[1] Torrington, Wyo.; and Scottsbluff and Gering, Nebr.
[2] Alliance, Nebr., and Lusk, Wyo.

TABLE 16.—*Major livestock market outlets used by farm operators in North Platte Valley, May 1, 1946, to May 1, 1947*

Major market outlet	Operators by districts							
	All districts		Goshen		Gering-Fort Laramie		Pathfinder	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Operators marketing livestock to—								
Other valley farmers	14	8.0	2	4.8	2	4.5	10	11.2
Local ranchers	3	1.7			2	4.6	1	1.1
Local sales rings [1]	58	33.1	13	30.9	9	20.5	36	40.4
Distant sales rings [2]	4	2.3			1	2.2	3	3.4
Local packing company	21	12.0	6	14.3	4	9.1	11	12.4
Central markets	36	20.6	16	38.1	11	25.0	9	10.1
Total	136	77.7	37	88.1	29	65.9	70	78.6
Operators marketing no livestock	39	22.3	5	11.9	15	34.1	19	21.4
Total operators	175	100.0	42	100.0	44	100.0	89	100.0

[1] Torrington, Wyo.; Scottsbluff and Gering, Nebr.
[2] Alliance, Nebr., and Lusk, Wyo.

TABLE 17.—*Changes planned in livestock operations, by farm operators in North Platte Valley, 1947*

Kind of change	Operators by districts			
	All districts	Goshen	Gering-Fort Laramie	Pathfinder
Surveyed operators:				
Plan changes in livestock operations:	*Number*	*Number*	*Number*	*Number*
Feed more cattle	40	9	6	25
Feed more sheep or lambs	16	5	6	5
Feed more cattle and sheep	2	0	1	1
Feed cattle instead of sheep	1	1	0	0
Feed own cattle instead of feeding on contract	3	0	2	1
Feed fewer sheep or lambs	3	1	1	1
Expand stock and/or dairy cattle	23	4	1	18
Expand farm-flock sheep	2	0	0	2
Raise more hogs	1	0	0	1
Reduce number of stock cattle	1	1	0	0
Total	92	21	17	54
Plan to quit farming or operate a different farm	11	2	2	7
Undecided on changes	7	2		
Plan no change in livestock operations	65	17	21	27
Total surveyed operators	175	42	44	89

TABLE 18.—*Source of grain fed by farm operators in North Platte Valley, 1946*

Type of grain feed	Amount of feed by districts							
	All districts		Goshen		Gering-Fort Laramie		Pathfinder	
	Hundredweight	*Percent*	*Hundredweight*	*Percent*	*Hundredweight*	*Percent*	*Hundredweight*	*Percent*
Corn:								
Raised on irrigated land	8,762	20.0	411	4.4	1,148	7.2	7,203	38.7
Raised on dry land	252	.6			11	.1	241	1.3
Purchased	34,894	79.4	8,967	95.6	14,748	92.7	11,179	60.0
Total	43,908	100.0	9,378	100.0	15,907	100.0	18,623	100.0
Barley:								
Raised on irrigated land	50,415	60.4	11,865	58.1	21,208	57.2	17,342	66.8
Raised on dry land	5,521	6.6	1,738	8.5	2,758	7.4	1,025	3.9
Purchased	27,552	33.0	6,808	33.4	13,132	35.4	7,612	29.3
Total	83,488	100.0	20,411	100.0	37,098	100.0	25,979	100.0
All grains:[1]								
Raised on irrigated land	65,553	48.2	13,294	42.7	23,303	43.0	28,956	57.1
Raised on dry land	6,156	4.5	1,978	6.4	2,803	5.2	1,375	2.7
Purchased	64,254	47.3	15,839	50.9	28,025	51.8	20,390	40.2
Total	135,963	100.0	31,111	100.0	54,131	100.0	50,721	100.0

[1] In addition to corn and barley, includes oats, rye, wheat, and dried beet pulp.

TABLE 19.—*Source of hay and roughage fed by farm operators in North Platte Valley, 1946*

Type of hay and roughage	Amount of feed by districts							
	All districts		Goshen		Gering-Fort Laramie		Pathfinder	
	Tons [1]	*Percent*	*Tons* [1]	*Percent*	*Tons* [1]	*Percent*	*Tons* [1]	*Percent*
Alfalfa:								
Raised on irrigated land	6,161	67.7	1,738	64.3	2,199	65.5	2,224	72.9
Raised on dry land								
Purchased	2,946	32.3	965	35.7	1,156	34.5	825	27.1
Total	9,107	100.0	2,703	100.0	3,355	100.0	3,049	100.0
Beet tops:								
Raised on irrigated land	3,990	69.5	1,142	70.8	1,831	75.3	1,017	59.8
Raised on dry land								
Purchased	1,755	30.5	471	29.2	601	24.7	683	40.2
Total	5,745	100.0	1,613	100.0	2,432	100.0	1,700	100.0
All hay and roughage: [2]								
Raised on irrigated land	10,762	62.2	3,066	55.8	4,095	64.1	3,601	66.6
Raised on dry land	128	.8	73	1.3	34	.5	21	.4
Purchased	6,401	37.0	2,358	42.9	2,256	35.4	1,787	33.0
Total	17,291	100.0	5,497	100.0	6,385	100.0	5,409	100.0

[1] All hay and roughage was converted to alfalfa-ton equivalent on basis of total digestable nutrients, as given in Feeds and Feedings, twentieth edition, by F. B. Morrison, which resulted in the following conversion factors: Corn silage and corn fodder (green weight basis) 0.324; wet beet pulp, 0.199; pea-vine silage, 0.354; and potatoes, 0.344. For beet tops, it was assumed that the tonnage of green tops at time of topping would equal 72 percent of the yield of beets and would contain 16.4 percent as much digestable nutrients as alfalfa. The conversion factor for beet tops, thus, was 11.8 percent of tonnage of beets produced.

[2] In addition to alfalfa and beet tops, includes wet beet pulp, corn fodder, various kinds of silage, potatoes, tame hay, and native hay.

TABLE 20.—*Number of farm operators buying livestock feed in North Platte Valley, by type of feed, 1946*

Type of feed bought	Operators buying feed, by districts							
	All districts		Goshen		Gering-Fort Laramie		Pathfinder	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Grains:								
Corn	76	43.4	19	45.2	19	43.2	38	42.7
Barley	75	42.9	22	52.4	17	38.6	36	40.4
Oats	16	9.1	1	2.4	2	4.5	13	14.6
Wheat	3	1.7	1	2.4	1	2.3	1	1.1
Ground mixed grains	4	2.3			2	4.5	2	2.2
Dried beet pulp	9	5.1			1	2.3	8	9.0
All grains	105	60.0	26	61.9	28	63.6	51	57.3
Protein supplements	38	21.7	10	23.8	9	20.5	19	21.3
Hay and roughage:								
Alfalfa hay	80	45.7	23	54.8	19	43.2	38	42.7
Other hay	7	4.0	2	4.8	1	2.3	4	4.5
Wet beet pulp	16	9.1	12	28.6	1	2.3	3	3.4
Beet tops	67	38.3	20	47.6	19	43.2	28	31.5
Silage	4	2.3			2	4.5	2	2.2
Corn fodder	2	1.1					2	2.2
Potatoes	1	.6			1	2.3		
All hay and roughage	110	62.9	29	69.0	30	68.2	51	57.3
All types of feed	134	76.6	32	76.2	35	79.5	67	75.3
No feed bought	41	23.4	10	23.8	9	20.5	22	24.7
Total	175	100.0	42	100.0	44	100.0	89	100.0

TABLE 21.—*Source of livestock feed bought by farm operators in North Platte Valley, 1946*

Source	Corn		Barley		Alfalfa		Beet tops	
	Bushels	*Percent*	*Bushels*	*Percent*	*Tons*	*Percent*	*Tons* [1]	*Percent*
Own landlord's share	1,758	2.8	17,154	32.8	1,171	39.7	11,648	78.3
Other valley farmers	5,115	8.2	11,533	22.1	1,705	57.9	3,003	20.2
Dry-land farmers	3,500	5.6	17,200	32.9				
Local feed dealers	37,765	60.6	6,402	12.2	70	2.4	227	1.5
Direct inshipments	14,175	22.8						
Total	62,313	100.0	52,289	100.0	2,946	100.0	14,878	100.0

[1] Tons of beet yields.

TABLE 22.—*Purchases and sales of feed by principal elevators and feed dealers in North Platte Valley, 1946–47 and normal*

Year and type of feed	Inship-ments	Obtained locally	Less out-ship-ments	Total amount sold locally	Sales to irrigated farms	Sales to dry-land farmers and ranchers
1946–47 feeding year:	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Corn	818		76	742	616	126
Barley		438	218	220	165	55
Oats		26	7	19	10	9
Protein supplements [1]	118	[2] 3	12	109	37	72
Mixed feeds	131	27	14	144	104	40
Normal or average year:						
Corn	1,167		76	1,091	838	253
Barley		430	124	306	228	78
Oats		21		21	11	10
Protein supplements [1]	252	[2] 5	12	245	107	138
Mixed feeds	145	17	14	148	107	41

[1] Includes meals, cakes, pellets, and cubes.
[2] Meat scraps

Source: Compiled from data furnished through courtesy of elevators and feed dealers. Truck shipments comprise a large part of these data. To convert tons and bushels to cars, the following average weights for cars were used: Corn, 100,000 pounds; barley, 90,000 pounds; oats, 80,000 pounds; protein supplements, 60,000 pounds; and mixed feeds, 60,000 pounds.

TABLE 23.—*Disposition of livestock feed produced by farm operators in North Platte Valley, 1946*

Disposition of all feed	Farms by districts							
	All districts		Goshen		Gering-Fort Laramie		Pathfinder	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Surveyed farms:								
Entire production fed	103	58.9	31	73.8	21	47.7	51	57.3
Entire production sold	2	1.1			2	4.6		
Landlord's share sold	22	12.6	2	4.8	7	15.9	13	14.6
Operator's surplus sold	30	17.1	6	14.3	7	15.9	17	19.1
Operator's surplus and landlord's share sold	15	8.6	3	7.1	7	15.9	5	5.6
No feed produced	3	1.7					3	3.4
Total	175	100.0	42	100.0	44	100.0	89	100.0

TABLE 24.—*Disposition of barley produced by farm operators in North Platte Valley, 1946*

Disposition of barley	Farms by districts							
	All districts		Goshen		Gering-Fort Laramie		Pathfinder	
Surveyed farms:	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Entire production fed	96	54.9	26	61.9	26	59.1	44	49.4
Entire production sold	6	3.4	1	2.4	4	9.1	1	1.1
Landlord's share sold	12	6.9	1	2.4	3	6.8	8	9.0
Operator's surplus sold	12	6.9	3	7.1	2	4.6	7	7.9
Operator's surplus and landlord's share sold	6	3.4			3	6.8	3	3.4
No barley produced	43	24.5	11	26.2	6	13.6	26	29.2
Total	175	100.0	42	100.0	44	100.0	89	100.0

TABLE 25.—*Disposition of alfalfa hay produced by farm operators in North Platte Valley, 1946*

Disposition of alfalfa hay	Farms by districts							
	All districts		Goshen		Gering-Fort Laramie		Pathfinder	
Surveyed farms:	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Entire production fed	103	58.9	33	78.6	24	54.5	46	51.7
Entire production sold	12	6.8			4	9.1	8	9.0
Landlord's share sold	18	10.3	3	7.1	8	18.2	7	7.9
Operator's surplus sold	13	7.4	3	7.1	2	4.5	8	9.0
Operator's surplus and landlord's share sold	3	1.7	1	2.4	1	2.3	1	1.1
No alfalfa hay produced	26	14.9	2	4.8	5	11.4	19	21.3
Total	175	100.0	42	100.0	44	100.0	89	100.0

TABLE 26.—*Feed crops sold by farm operators in North Platte Valley, 1946*

Type of feed	All districts			Goshen		
	Produced	Sold	Percentage sold	Produced	Sold	Percentage sold
Feed grains:	*Bushels*	*Bushels*		*Bushels*	*Bushels*	
Corn	22,470	4,595	20.4	735		
Barley	159,318	30,322	19.0	33,409	3,270	9.8
Oats	23,231	3,270	14.1	1,900		
Other	358					
Hay and roughage:	*Tons*	*Tons*		*Tons*	*Tons*	
Alfalfa	8,761	1,725	19.7	2,202	101	4.6
Other tame hay	342	108	31.6	260	108	41.5
Native hay	8					
Corn fodder	1,584			1,080		
Other forage	774					
Beet tops [1]	48,506	3,310	6.8	14,309	427	3.0

Type of feed	Gering-Fort Laramie			Pathfinder		
	Produced	Sold	Percentage sold	Produced	Sold	Percentage sold
Feed grains:	*Bushels*	*Bushels*		*Bushels*	*Bushels*	
Corn	4,585	2,305	50.3	17,150	2,290	13.4
Barley	72,248	16,088	22.3	53,661	10,964	20.4
Oats	4,790	1,210	25.3	16,541	2,060	12.5
Other				358		
Hay and roughage:	*Tons*	*Tons*		*Tons*	*Tons*	
Alfalfa	3,162	883	27.9	3,397	741	21.8
Other tame hay	20			62		
Native hay				8		
Corn fodder	44			460		
Other forage	500			274		
Beet tops [1]	20,277	1,564	7.7	13,920	1,319	9.5

[1] Tons of beet yield.

TABLE 27.—*Farmers in North Platte Valley selling livestock feed, by type of major buyer, 1946*

Major buyer of feed	Operators selling feed by districts							
	All districts		Goshen		Gering-Fort Laramie		Pathfinder	
Farmers selling mainly to—	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Other valley farmers	40	22.8	6	14.3	11	25.0	23	25.8
Nearby ranchers	1	.6	1	2.4				
Valley feeders	7	4.0	2	4.8	3	6.8	2	2.3
Local dealers	21	12.0	2	4.8	9	20.5	10	11.2
Total, selling feed	69	39.4	11	26.3	23	52.3	35	39.3
Total, surveyed operators	175	100.0	42	100.0	44	100.0	89	100.0

TABLE 28.—*Changes planned in cropping practices by farm operators in North Platte Valley, 1947*

Type of change	Operators by districts			
	All districts	Goshen	Gering-Fort Laramie	Pathfinder
Surveyed operators:				
Plan changes in cropping practices:	*Number*	*Number*	*Number*	*Number*
Increase beans	12	2	8	2
Decrease beans	43	6	10	27
Increase beets	22	1	18	3
Decrease beets	17	3	3	11
Increase potatoes	6	2	2	2
Decrease potatoes	25	2	8	19
Increase alfalfa	31	7	5	19
Decrease alfalfa	8	0	7	1
Increase barley	16	3	6	7
Decrease barley	7	0	6	1
Increase corn	6	1	4	1
Decrease corn	4	0	1	3
Increase pasture	17	3	2	12
Decrease pasture	0	0	0	0
Total	84	15	31	38
Plan to quit farming or operated different farm	11	2	2	7
Plan no change in cropping practices	80	25	11	44
Total surveyed operators	175	42	44	89

TABLE 29.—*Tenure of operators of irrigated farms in North Platte Valley, 1946* [1]

Tenure of operator	Operators by district							
	All districts		Goshen		Gering-Fort Laramie		Pathfinder	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Surveyed operators:								
Owners	68	38.9	19	45.2	14	31.8	35	39.3
Part owners	17	9.7	8	19.0	3	6.8	6	6.8
Tenants:								
Tenants related to landlords	18	10.3	2	4.8	7	15.9	9	10.1
Other tenants	72	41.1	13	31.0	20	45.5	39	43.8
Total tenants	90	51.4	15	35.8	27	61.4	48	53.9
Total serveyed operators	175	100.0	42	100.0	44	100.0	89	100.0

[1] This tenure classification is based on the tenure status of only the irrigated land. If dry land were included, there would be a slightly smaller number of owner-operators and a larger number of part owners.

TABLE 30.—*Proportion of class 1 and class 2 land in operating units, by tenure of operator in North Platte Valley, 1946*

Tenure of operators	Class 1 land				Class 1 plus class 2 land			
	All districts	Goshen	Gering-Fort Laramie	Pathfinder	All districts	Goshen	Gering-Fort Laramie	Path finder
Surveyed operators:	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Owners	16.8	29.9	44.1	5.9	34.7	60.0	73.3	16.0
Part owners	38.5	29.0	59.7	17.1	61.8	60.3	78.8	29.4
Tenants:								
Tenants related to landlords	29.2	.....	64.0	3.2	63.4	93.8	88.4	37.6
Other tenants	29.7	43.0	53.6	10.1	52.0	66.1	84.6	26.8
Total tenants	29.6	39.1	56.7	8.6	54.5	68.7	85.8	29.2
Total surveyed operators	27.5	32.7	56.0	8.2	50.0	63.0	82.5	24.3

TABLE 31.—*Average sugar-beet yields, by tenure of operator, in North Platte Valley, 1946*

Tenure of operator	Yields by districts			
	All districts	Goshen	Gering-Fort Laramie	Pathfinder
Surveyed operators:	*Tons*	*Tons*	*Tons*	*Tons*
Owners	13.55	12.35	14.95	12.52
Part owners	14.00	11.93	15.61	16.04
Tenatns:				
Tenants related to landlords	15.07	15.05	15.97	14.31
Other tenants	14.62	14.71	15.77	13.18
Total tenants	14.71	14.74	15.92	13.44
Total surveyed operators	14.25	13.30	15.55	13.59

TABLE 32.—*Operators feeding livestock, by tenure of operator, in North Platte Valley, May 1, 1946, to May 1, 1947*

Tenure of operator	Operators feeding livestock, by district							
	All districts		Goshen		Gering-Fort Laramie		Pathfinder	
	Number	*Percent* [1]	*Number*	*Percent* [1]	*Number*	*Percent* [1]	*Number*	*Percent* [1]
Surveyed operators feeding livestock:								
Owners	21	30.9	6	31.6	5	35.7	10	28.6
Part owners	10	58.8	5	62.5	2	66.7	3	50.0
Tenants:								
Tenants related to landlords	9	50.0	1	50.0	6	85.7	2	22.2
Other tenants	31	43.1	7	53.8	13	65.0	11	28.2
Total tenants	40	44.4	8	53.3	19	70.4	13	27.1
Total surveyed operators	71	40.6	19	45.2	26	59.1	26	29.2

[1] Number of operators feeding livestock in percent of total number in each tenure group.

TABLE 33.—*Number of livestock handled by farm operators, by tenure of operator, in North Platte Valley, May 1, 1946, to May 1, 1947*

Tenure of operator	Operators		Livestock handled by farm operators					
			Cattle		Sheep		Hogs	
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Surveyed operators:								
Owners	68	38.9	2,620	41.0	17,747	42.2	746	69.8
Part owners	17	9.7	742	11.6	8,612	20.5	130	12.2
Tenants	90	51.4	3,034	47.4	15,666	37.3	193	18.0
Total	175	100.0	6,396	100.0	42,025	100.0	1,069	100.0

EXHIBIT B

TWENTY-FIFTH ANNUAL REPORT OF PATHFINDER IRRIGATION DISTRICT, 1950

Officers: A. E. Boggs, president; G. H. Storm, manager; Emily M. Knoepfel, secretary-treasurer.

Directors: A. E. Boggs, Morrill; M. O. Andrews, Scottsbluff; George D. Blackburn, Bayard.

MANAGERS'S REPORT

This report covers that part of the North Platte project in Nebraska and Wyoming known as the interstate division, including the canals beginning in sec. 11, T. 25, R. 65, in Wyoming, and ending in sec. 25. T. 21, R. 51 in Nebraska, and all the lands lying between those canals and the Tri-State Canal, except the lands

in Wyoming within the boundaries of the Lingle Water Users Association and the Hill Lateral district.

The Pathfinder Reservoir, Guernsey Reservoir, Whalen Dam, and headworks of the interstate canal are part of the reserved works, and are operated and maintained by the Bureau of Reclamation. The Pathfinder Irrigation District pays to the United States, in advance, a portion of the cost of operating and maintaining those works. Other irrigation works of the interstate division are operated and maintained by the Pathfinder Irrigation District.

The lands in the State of Wyoming, not included within the boundaries of the Lingle Water Users Association and the Hill Lateral district, are a part of the interstate division, but are not within the boundaries of the Pathfinder irrigation district. The district acts as fiscal agent in the collection of construction payments for those lands. The district treasurer collects the amount shown on the bills prepared by the Bureau of Reclamation and forwards the money to the Bureau.

The lands in Nebraska are within the boundaries of the Pathfinder irrigation district, and the district collects the construction charges by taxation through the county treasurer for all lands in Nebraska except from the owners who elected to remain out of the district, and nonconsenting lands which retain their contract with the Bureau of Reclamation and are paying the old rates per acre regardless of the land classification.

The lands in the district are classified into five classes, according to the topography of the land and productivity of the soil. Only lands in classes 1 to 4 are assessed for construction by the district, and the annual assessment is based on 5 percent of the 10-year average of the gross average annual acre income of all the classes of land.

The district is charged for construction by the Bureau of Reclamation as though the lands in classes 1 to 4 were in a single class, but the district assesses at different rates per acre in order to give the owners of the less-productive lands an opportunity to build up the soil.

Profits from the project-owned power plants are applied as a credit to reduce the annual assessments against the land for the annual construction payment due to the United States. The power returns are not sufficient to meet the annual construction payment and the difference is made up by an assessment against the land. This year the charges were as follows:

	Per acre
Class 1	$2.55
Class 2	2.35
Class 3	2.00
Class 4	1.60

The operation and maintenance charge is the same for all classes of land, and is payable direct to the district treasurer. This year the operation and maintenance charge was $2 per acre, and the charge could be paid in two installments, however, the total had to be paid by July 1 or no water would be delivered after that date.

The headquarters of the district, including the machine shop, warehouse, and material yards, are located in Mitchell, Nebr. The shop personnel consists of one shop foreman, Mr. A. H. Hill, and two other helpers. The shop personnel maintain and keep in operation the district's cars, trucks, tractors, dragline, and other equipment and are a main cog in the operation of the irrigation works. The office personnel consists of the manager, assistant manager, secretary-treasurer, and a timekeeper. The cost keeping is done also by the timekeeper.

There are four divisions of the district as follows:

Division No. 1: The first division of the main canal consists of 45 miles of main canal. There are no Government laterals in this district, but water is delivered into the heads of the laterals for approximately 16,000 acres of land within the boundaries of the Lingle Water Users Association and Hill Lateral District. This division is under the supervision of Harold Fintus, watermaster, located at Fort Laramie, Wyo., who has a regular force of one foreman, one maintenance crew, one day rider with district auto. The night ride is taken care of by the watermaster when the canal is operated to capacity.

Division No. 2: The second division of the main canal and first lateral district consists of 35 miles of main canal, 216 miles of laterals, 20 miles of open drain, and 1¾ miles of closed drain. There are approximately 36,500 acres of irrigable land in this watermaster's district. J. D. Canfield, watermaster in charge, has an average force of one water-record clerk during the summer months, one foreman, eight day riders, and one night rider when the water is high in the canal. The foreman tends drain pumps, rides ditches, and collects crop data in addition to other duties.

Division No. 3: The third division of main canal and second lateral district has 16 miles of main canal, 210 miles of laterals, 14½ miles open drain, and about 16 miles of closed drain. The irrigable area for this watermaster's district is approximately 37,450 acres. P. G. Splattstoesser, watermaster in charge, has an average force of 1 foreman, 10 day riders, 1 gate tender, and 1 night rider part-time. Water records are taken care of by the headquarter's office force.

Division No. 4: The third lateral district consists of 37 miles of high-line canal, 5 miles of reservoir-supply canal, 44 miles of low-line canal, 207 miles of laterals, about 4 miles closed drain, and 13 miles open drain, with approximately 39,500 acres of irrigable land. J. C. Judd, watermaster in charge, has an average force of 2 foremen, 1 water-record clerk and 10 ditch riders. The water-record clerk also acts as gate tender at Minatare Dam, collects and compiles crop data, and takes care of material and supplies at camp No. 12.

WEATHER CONDITIONS

Weather conditions compared favorably with previous years. The following table shows the last killing frost in the spring and the first in the fall.

Killing frosts—Records from Lake Minatare (past 27 years)

Year	Last in the spring	First in the fall	Number of growing days	Year	Last in the spring	First in the fall	Number of growing days
1924	May 12	Oct. 2	142	1938	May 8	Oct. 18	163
1925	May 5	Oct. 6	154	1939	Apr. 21	Sept. 30	162
1926	May 14	Sept. 24	133	1940	Apr. 23	Oct. 30	190
1927	May 10	Sept. 26	139	1941	Apr. 24	Sept. 9	138
1928	Apr. 27	Sept. 24	150	1942	May 3	Sept. 18	138
1929	May 6	Sept. 9	126	1943	May 11	Oct. 15	157
1930	May 18	Oct. 15	150	1944	May 8	Oct. 11	156
1931	May 22	Oct. 22	153	1945	May 16	Sept. 20	127
1932	Apr. 27	Oct. 5	161	1946	May 11	Sept. 23	135
1933	May 14	Oct. 12	151	1947	May 29	Sept. 15	119
1934	Apr. 27	Sept. 15	141	1948	May 9	Oct. 7	151
1935	May 4	Sept. 28	147	1949	Apr. 18	Sept. 13	148
1936	Apr. 16	Sept. 27	164	1950	May 29	Oct. 1	124
1937	Apr. 29	Sept. 26	150	Average	May 6	Sept. 30	147

Precipitation past 10 years, experiment farm records

Month	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	Total	Average
April	2.30	4.00	1.52	1.41	1.96	0.56	1.53	0.86	1.36	0.96	16.46	1.65
May	.90	4.35	2.21	1.49	.98	4.36	2.65	2.93	2.74	2.21	24.82	2.48
June	4.25	2.60	2.06	2.01	8.15	1.84	7.87	2.31	2.05	.54	30.68	3.07
July	1.14	1.13	.34	2.12	1.91	.20	.88	1.98	2.19	2.20	14.09	1.41
August	2.63	.40	.64	1.52	2.35	.42	.57	1.96	1.35	.20	12.04	1.20
September	1.28	1.46	.19	.08	1.02	3.17	.57	1.65	.64	2.56	12.62	1.26
Total	12.50	13.94	6.96	8.63	13.37	10.55	14.07	11.69	10.32	8.67	110.70	11.07
Year total	15.48	17.62	8.82	11.79	16.20	13.96	17.68	18.90	13.77	9.79	144.06	14.41

LAKE MINATARE RECORDS

The following table shows the monthly precipitation at Lake Minatare from Apr. 1 to Oct. 1, and the amount of irrigation water applied to the land. The grand total is the irrigation water applied to the land plus the precipitation, all in inches.

Month	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	Total	Average
April	2.48	4.91	1.76	2.28	1.33	0.28	1.14	1.11	1.02	0.47	17.78	1.78
May	1.00	3.31	2.29	1.88	1.23	4.59	2.68	3.62	2.58	1.19	24.37	2.44
June	6.89	2.83	2.91	2.05	5.40	1.76	8.83	4.93	3.12	.30	39.02	3.90
July	1.76	.91	.31	1.92	.69	.00	1.89	2.66	2.08	1.61	13.83	1.38
August	.89	1.03	.05	1.89	2.17	.64	.45	1.48	.90	.77	10.27	1.03
September	1.16	1.06	.04	.42	1.18	1.52	1.01	1.79	1.04	2.46	11.68	1.17
Total	14.18	14.05	7.36	10.44	12.00	8.79	16.00	15.59	10.74	6.80	116.95	11.70
Irrigation applied in inches	13.32	18.24	22.80	25.08	24.12	22.92	21.48	23.88	25.32	27.12	224.28	22.43
Grand total	27.50	32.29	30.16	35.52	36.12	31.71	37.48	39.47	36.06	33.92	341.23	34.12
Year total	16.06	17.89	8.73	13.19	13.88	12.07	19.54	18.90	13.16	9.79	143.21	14.32

Weather conditions, Lake Minatare Pathfinder irrigation district, 1950

Month	Temperature °F			Precipitation		
	Maximum	Minimum	Mean	Total (inches)	Greatest 24-hour	
					Amount (inches)	Date
January	66	−18	22	0.14	0.10	26
February	75	−6	33	.02	.02	8
March	69	−7	34	.39	.13	26
April	83	13	44	.47	.16	10
May	91	25	52	1.19	.32	29
June	94	36	65	.30	.10	19
July	95	39	69	1.61	.38	4
August	96	41	71	.77	.40	4
September	90	38	59	2.46	.98	17
October	85	27	54	.15	.15	1
November	69	−5	36	.22	.14	19
December	63	−11	33	.00	Trace	7
The year	96	−18	47.6	7.72	.98	Sept. 17

Date of last killing frost in spring	**May 29**
Date of first killing frost in fall	**Oct. 1**
Date of serious rainfall	**Aug. 24**
Date of hail storm	**do.**

Weather conditions, experiment farm, Pathfinder irrigation district, 1950

Month	Temperature °F			Precipitation			Evaporation (inches)	Total wind movement (miles)	Sky		
	Maximum	Minimum	Mean	Total (inches)	Greatest 24 hour				Number of days		
					Amount (inches)	Date [1]			Clear	Part cloudy	Cloudy
January	67	−14	22.5	0.13	0.09	24		5,243	4	22	5
February	72	−5	33.8	.12	.09	7		4,057	7	19	2
March	72	−8	32.8	.37	.14	10		7,386	3	22	6
April	82	12	43.1	.96	.43	9	4.153	6,680	7	18	5
May	86	26	50.5	2.21	.77	24	4.221	5,808	9	14	8
June	94	36	65.2	.54	.22	18	6.751	4,804	13	13	4
July	96	43	69.3	2.20	.42	17	6.776	3,335	5	25	1
August	93	39	67.8	.20	.11	18	6.012	2,793	14	16	1
September	93	41	59.5	2.56	1.02	16	3.543	3,296	11	9	10
October	87	29	53.8	.13	.12	2		3,104	14	16	1
November	69	−7	34.3	.31	.12	18		4,363	3	25	2
December	63	−11	31.3	.06	.06	4		3,947	9	20	2
The year	96	−14	47.0	9.79	1.02	Sept. 16	31.456	54,816	99	219	47

[1] Date shown—24-hour period starts at 8:00 o'clock a. m. on that date.

Date of last killing frost in spring ..... May 19
Date of first killing frost in fall ..... Oct. 2

WATER SUPPLY AND PROJECT OPERATION

The water right for the North Platte project consists of natural flow right from the North Platte River of 1904 and a storage right of the same date in the Pathfinder Reservoir, storage right of April 20, 1923, in the Guernsey Reservoir. The interstate division of the North Platte project also has storage rights of 1904 in Lake Alice, Lake Winter's Creek and Lake Minatare. All of the water for storage is derived from the North Platte River.

The Pathfinder Dam is located about 45 miles southwest of the city of Casper, Wyo. The reservoir is an on-channel reservoir and has a capacity of 1,070,000 acre-feet at the spillway crest.

There are two other channel reservoirs in this vicinity; namely, the Seminoe and Alcova, neither of which were constructed for the benefit of the North Platte project but are for use of the Kendrick project which was first watered in 1946.

The water of the North Platte River must pass through the Seminoe Reservoir in order to reach the Pathfinder Reservoir; when released from the Pathfinder Reservoir it must pass through the Alcova Reservoir in order to flow down the North Platte River to reach the Guernsey Reservoir and the Whalen diversion dam for diversion into the canals.

The Guernsey Reservoir is an on-channel reservoir and is located 186 miles downstream from the Pathfinder Dam. It has a designed capacity of 72,000 acre-feet, but has gradually filled with silt until the last survey showed that the capacity has decreased to 46,050 acre-feet. The principal uses of this reservoir are the regulation of the river flow and the generation of power.

The Whalen diversion dam is located on the North Platte River about 7 miles downstream from the Guernsey Dam. At this dam, water is diverted into the interstate canal, and carried through the canal a distance of 94.6 miles where it is emptied into Lake Alice and then through Lake Alice and the reservoir canal for a distance of 5 miles for storage in Lake Winter's Creek and Lake Minatare.

Lake Alice has a capacity of 11,000 acre-feet, Lake Winter's Creek 3,300 acre-feet and Lake Minatare 65,000 acre-feet. All three lakes were formed by the construction of dams.

Water distribution in comparison, by years, all in acre-feet

[Water year figured from Oct. 1 to Oct. 1]

District	Acreage supplied	Delivered to land	Acre-feet per acre	Acre-feet waste	Canal system efficiency in percent
1947					
Pathfinder	96,038	188,642	1.96	2,788	48.5
Goshen	45,600	66,278	1.45	4,346	62.4
Gering-Fort Laramie	51,896	79,386	1.53	6,870	65.9
Northport	10,690	18,652	1.74	6,954	50.4
1948					
Pathfinder	103,577	205,988	1.99	1,124	47.0
Goshen	53,451	80,868	1.51	3,247	60.3
Gering-Fort Laramie	53,960	79,386	1.47	8,870	55.5
Northport	12,575	24,700	1.96	5,903	51.0
1949					
Pathfinder	102,263	215,660	2.11	410	47.5
Goshen	49,248	68,650	1.39	1,443	61.7
Gering-Fort Laramie	54,625	95,850	1.76	8,320	62.4
Northport	13,246	26,534	2.00	5,349	54.1

Water distribution in comparison, by years, all in acre-feet—Continued

[Water year figured from Oct. 1 to Oct. 1]

1950

District	Acreage supplied	Delivered to land	Acre-feet per acre	Acre-feet waste	Canal system efficiency in percent
Pathfinder	98,785	223,808	2.26	1,331	43.4
Goshen	49,248	89,010	1.81	4,270	61.6
Gering-Fort Laramie	53,685	109,830	2.05	8,608	61.8
Northport	13,242	25,711	1.94	5,179	53.2

INFLOW

Reservoir	1946	1947	1948	1949	1950
Seminoe	762,630	1,100,790	867,910	1,329,020	975,341
Pathfinder	985,540	880,070	1,023,070	1,279,980	1,242,478
Alcova	954,009	708,380	1,036,200	936,440	1,090,282
Guernsey	1,129,150	1,038,720	1,187,650	1,096,460	1,200,666

OUTFLOW

Seminoe	910,730	747,240	954,610	1,148,440	1,044,142
Pathfinder	947,130	704,600	1,030,050	924,880	1,078,167
Alcova	889,035	662,660	1,005,470	903,610	1,041,002
Guernsey	1,132,710	1,035,880	1,169,130	1,078,770	1,210,676

CARRY-OVER

Seminoe	562,050	871,790	728,160	856,030	746,400
Pathfinder	50,760	202,550	163,390	474,930	592,790
Alcova	82,740	109,390	131,700	157,280	173,180
Guernsey	11,710	10,100	24,790	36,980	21,940
Total	707,260	1,193,830	1,048,040	1,525,220	1,534,310

CARRY OVER OF INLAND RESERVOIRS AS OF DEC. 31

Lake Alice	0	0	0	0	0
Winter's Creek	582	528	1,151	1,018	1,196
Lake Minatare	19,317	22,404	19,317	25,736	29,945
Total	19,899	22,932	20,468	26,754	31,141

MAXIMUM STORAGE—ALL RESERVOIRS

Seminoe	820,000	983,410	947,470	1,073,050	902,640
Pathfinder	424,670	539,960	743,420	918,200	1,078,170
Alcova	189,520	186,650	179,540	185,240	188,520
Guernsey	46,590	47,260	49,150	48,980	49,590
Lake Alice	12,955	12,077	12,796	13,118	12,077
Winter's Creek	1,083	1,562	1,536	1,486	1,906
Lake Minatare	59,910	63,382	57,993	56,518	62,506

Monthly water storage, Pathfinder irrigation district, 1950

LAKE ALICE

[Quantities in acre-feet]

Month	Inflow			Outflow, storage release	Losses—seepage			Total outflow and losses	Storage end of month	Elevation of water surface end of month
	Delivered	Rain	Total		Total	Acreage submerged	Loss per acre			
Storage hold-over from previous year, Dec. 31										*Feet* 4,159.0
January		1	1		1	60		1		4,159.0
February		0	0		0	60		0		4,159.0
March	9,120	17	9,137	4,102	1,492	510	2.9	5,594	3,543	4,170.6
April	34,144	28	34,172	26,914	2,776	715	3.9	29,690	8,025	4,177.8
May	17,748	76	17,824	10,916	4,506	768	5.9	15,422	10,427	4,181.1
June	10,724	18	10,742	9,694	2,432	736	3.3	12,126	9,043	4,179.2
July	7,613	93	7,706	7,946	1,414	695	2.0	9,360	7,389	4,176.9
August	4,010	27	4,037	9,026	124	427	.3	9,150	2,276	4,167.9
September	11,459	90	11,549	11,748	+373	440	+.9	11,375	2,450	4,168.3
October	12,640	1	12,641	13,550	1,541	60	.0	15,091	0	4,159.0
November	0	1	1		1	60	.0	1	0	4,159.0
December	0	0				60	.0			
Total or mean	107,458	352	107,810	93,896	13,914		3.6	107,810		

LAKE MINATARE

Storage hold-over from previous year, Dec. 31									25,736	4,105.8
January		16	16		445	1,407	0.3	445	25,307	4,105.5
February		2	2		431	1,407	.3	431	24,878	4,105.2
March	3,778	49	3,827		1,505	1,493	1.0	1,505	27,200	4,106.8
April	28,654	63	28,717		3,108	2,027	1.5	3,108	52,809	4,121.2
May	9,917	207	10,124	4,770	+251	2,091	+.1	4,519	58,414	4,123.9
June	4,398	49	4,447	14,724	+471	1,962	+.2	14,253	48,608	4,119.1
July	443	212	655	19,570	+875	1,584	+.6	18,695	30,568	4,109.0
August	761	74	835	17,169	+2,253	1,148	+2.0	14,916	16,487	4,098.6
September	8,843	235	9,078	8,966	+340	1,148	+.3	8,626	16,939	4,099.0
October	13,214	20	13,234		+1,039	1,584	+.7	−1,039	31,212	4,109.4
November		29	29		29	1,584	.0	29	31,212	4,109.4
December					1,267	1,584	.8	1,267	29,945	4,108.6
Total or means	70,008	956	70,964	65,199	1,556		1.0	66,755		

WINTER'S CREEK

Storage hold-over from previous year, Dec. 31									1,018	4,121.0
January	0	3	3	0	3	215	0	3	1,018	4,121.0
February	0	0	0	0	207	198	1.0	207	811	4,120.0
March	0	6	6	0	198	187	1.1	198	619	4,119.4
April	0	7	7	0	+69	191	+.4	−69	695	4,119.4
May	790	25	815	132	+340	252	+1.3	−208	1,718	4,123.9
June	0	6	6	380	+167	252	+.7	213	1,511	4,123.1
July	0	33	33	542	+484	251	+1.9	58	1,486	4,123.0
August	0	15	15	728	+378	227	+1.7	350	1,151	4,121.6
September	0	48	48	368	+412	235	+1.8	−44	1,243	4,122.0
October	0	3	3	0	+116	243	+.5	−116	1,362	4,122.5
November	0	4	4	0	4	243	.0	4	1,362	4,122.5
December	0	0	0	0	166	231	.7	166	1,196	4,121.8
Total or mean	790	150	940	2,150	+1,388		+6.1	762		

Lake Alice:

	Acre-feet
Maximum storage during year	12,077
Minimum storage during year	0
	Feet
Maximum gage height (May 11)	4,182.9
Minimum gage height (Mar. 23)	4,159.0

Lake Minatare:	*Acre-feet*
Maximum storage during year	62,506
Minimum storage during year	11,539
	Feet
Maximum gage height (May 15)	4,125.8
Minimum gage height (Sept. 21)	4,093.8
Winter's Creek:	*Acre-feet*
Maximum storage during year	1,906
Minimum storage during year	695
	Feet
Maximum gage height (May 23)	4,124.6
Minimum gage height (Mar. 30)	4,119.4

Monthly water diversions from North Platte River, Pathfinder irrigation district, years 1946–50

[Quantities in acre-feet]

Month	1946	1947	1948	1949	1950
March		26,020	4,980		17,010
April	52,510	57,330	60,760	47,460	48,748
May	64,530	57,780	72,828	73,470	62,827
June	78,430	8,670	78,816	58,960	100,496
July	118,770	95,250	117,986	125,970	127,678
August	122,880	126,980	124,346	127,840	121,218
September	67,970	91,850	81,177	84,730	87,163
October				20,940	12,411
Total	505,090	463,880	540,893	539,370	577,551
Acreage irrigated	119,004	119,699	117,344	116,960	113,078
Per acre irrigated	4.24	3.87	4.61	4.61	5.11

Monthly water deliveries to the land

[Quantities in acre-feet]

WHOLE INTERSTATE DIVISION

Month	1944	1945	1946	1947	1948	1949	1950
May	6,502	13,156	13,714	14,079	20,933	11,253	18,475
June	21,253	9,389	29,047	251	21,161	19,965	41,646
July	50,336	52,636	56,960	42,002	52,786	67,469	57,813
August	67,851	62,378	67,801	79,881	66,800	75,696	64,749
September	48,215	53,277	23,065	52,429	44,308	41,262	41,125
Total	194,157	190,836	200,587	188,642	205,988	215,645	223,808
Irrigable acres in farms irrigated	92,794	95,051	104,831	105,433	105,486	102,263	98,785
Acre-feet per acre	2.09	2.01	1.91	1.79	1.99	2.11	2.26

LOW LINE SYSTEM ONLY

May	21	711	565	754	2,018	282	1,482
June	1,784	744	4,173	32	2,930	2,095	5,952
July	6,288	7,786	7,419	4,280	6,215	8,990	8,445
August	9,214	7,948	10,923	10,982	10,710	11,179	6,224
September	7,036	7,964	4,654	7,221	6,299	5,336	4,165
Total	24,343	25,153	27,734	23,269	28,172	27,882	26,268
Irrigable acres in farms irrigated	11,594	14,108	16,229	15,242	14,097	14,723	14,723
Acre-feet per acre	2.10	1.78	1.71	1.53	2.00	1.89	1.78

Monthly water distribution, Pathfinder Irrigation District, 1950

MAIN CANAL[1]

[Quantities in acre-feet]

Month	Diverted from stream	Delivered to—			Net supply	Main canal waste	Main canal losses	Delivered to laterals	Lateral waste	Lateral losses	Delivered to farms	
		N. P. C. & C. Co.	High line	Reservoir No. 1							Total	Per acre
March	17,010	0	0	9,120	7,890	0	7,890	0	0	0	0	0.00
April	48,748	0	3,064	34,144	11,540	0	11,540	0	0	0	0	.00
May	62,827	4,560	6,584	17,748	33,935	0	13,314	20,621	5	6,910	13,706	.20
June	100,496	9,912	11,816	10,724	68,044	0	26,062	41,982	14	15,363	26,605	.38
July	127,678	11,726	13,274	7,613	95,065	126	37,116	57,823	13	19,427	38,383	.55
August	121,218	10,598	11,710	4,010	94,900	250	32,785	61,865	0	15,205	46,660	.67
September	87,163	6,276	10,723	11,459	58,705	30	16,557	42,118	11	12,648	29,459	.42
October	12,411	0	764	12,640	−993	0	−993	0	0	0	0	.00
Total	577,551	43,072	57,935	107,458	369,086	406	144,271	224,409	43	69,553	154,813	2.22
Acre-feet per acre					5.30	0.01	2.07	3.22	0.00	1.00	2.22	
Percent net supply					100	0	39	61	0	19	42	

[1] Acres irrigated, 69,694.

HIGH LINE CANAL[2]

Month	Diverted from main canal	Delivered to—			Net supply	Main canal losses	Delivered to laterals	Lateral losses	Delivered to farms	
		Reservoir No. 1	Reservoir No. 3	Low line					Total	Per acre
April	3,064	72	2,742		250	250	0	0	0	0.00
May	6,584	168	2,772	110	3,534	1,804	1,730	422	1,308	.14
June	11,816	150	654	119	10,893	4,257	6,636	1,458	5,178	.54
July	13,274	6	179	46	13,043	5,935	7,108	1,253	5,855	.61
August	11,710	30	451	86	11,143	4,763	6,380	1,080	5,300	.56
September	10,723	180	2,491	169	7,883	3,569	4,314	673	3,641	.38
October	764	12	338	0	414	414	0	0	0	.00
Total	57,935	618	9,627	530	47,160	20,992	26,168	4,886	21,282	2.23
Acre-feet per acre					4.93	2.19	2.74	0.51	2.23	
Percent, net supply					100	45	55	10	45	

[2] Acres irrigated, 9,559.

Lake Minatare:	*Acre-feet*
Maximum storage during year	62,506
Minimum storage during year	11,539
	Feet
Maximum gage height (May 15)	4,125.8
Minimum gage height (Sept. 21)	4,093.8
Winter's Creek:	*Acre-feet*
Maximum storage during year	1,906
Minimum storage during year	695
	Feet
Maximum gage height (May 23)	4,124.6
Minimum gage height (Mar. 30)	4,119.4

Monthly water diversions from North Platte River, Pathfinder irrigation district, years 1946–50

[Quantities in acre-feet]

Month	1946	1947	1948	1949	1950
March		26,020	4,980		17,010
April	52,510	57,330	60,760	47,460	48,748
May	64,530	57,780	72,828	73,470	62,827
June	78,430	8,670	78,816	58,960	100,496
July	118,770	95,250	117,986	125,970	127,678
August	122,880	126,980	124,346	127,840	121,218
September	67,970	91,850	81,177	84,730	87,163
October				20,940	12,411
Total	505,090	463,880	540,893	539,370	577,551
Acreage irrigated	119,004	119,699	117,344	116,960	113,078
Per acre irrigated	4.24	3.87	4.61	4.61	5.11

Monthly water deliveries to the land

[Quantities in acre-feet]

WHOLE INTERSTATE DIVISION

Month	1944	1945	1946	1947	1948	1949	1950
May	6,502	13,156	13,714	14,079	20,933	11,253	18,475
June	21,253	9,389	29,047	251	21,161	19,965	41,646
July	50,336	52,636	56,960	42,002	52,786	67,469	57,813
August	67,851	62,378	67,801	79,881	66,800	75,696	64,749
September	48,215	53,277	23,065	52,429	44,308	41,262	41,125
Total	194,157	190,836	200,587	188,642	205,988	215,645	223,808
Irrigable acres in farms irrigated	92,794	95,051	104,831	105,433	105,486	102,263	98,785
Acre-feet per acre	2.09	2.01	1.91	1.79	1.99	2.11	2.26

LOW LINE SYSTEM ONLY

May	21	711	565	754	2,018	282	1,482
June	1,784	744	4,173	32	2,930	2,095	5,952
July	6,288	7,786	7,419	4,280	6,215	8,990	8,445
August	9,214	7,948	10,923	10,982	10,710	11,179	6,224
September	7,036	7,964	4,654	7,221	6,299	5,336	4,165
Total	24,343	25,153	27,734	23,269	28,172	27,882	26,268
Irrigable acres in farms irrigated	11,594	14,108	16,229	15,242	14,097	14,723	14,723
Acre-feet per acre	2.10	1.78	1.71	1.53	2.00	1.89	1.78

Monthly water distribution, Pathfinder Irrigation District, 1950
MAIN CANAL

Monthly water distribution, Pathfinder Irrigation District, 1950

MAIN CANAL[1]

[Quantities in acre-feet]

Month	Diverted from stream	Delivered to—			Net supply	Main canal waste	Main canal losses	Delivered to laterals	Lateral waste	Lateral losses	Delivered to farms	
		N. P. C. & C. Co.	High line	Reservoir No. 1							Total	Per acre
March	17,010	0	0	9,120	7,890	0	7,890	0	0	0	0	0.00
April	48,748	0	3,064	34,144	11,540	0	11,540	0	0	0	0	.00
May	62,827	4,560	6,584	17,748	33,935	0	13,314	20,621	5	6,910	13,706	.20
June	100,496	9,912	11,816	10,724	68,044	0	26,062	41,982	14	15,363	26,605	.38
July	127,678	11,726	13,274	7,613	95,065	126	37,116	57,823	13	19,427	38,383	.55
August	121,218	10,598	11,710	4,010	94,900	250	32,785	61,865	0	15,205	46,660	.67
September	87,163	6,276	10,723	11,459	58,705	30	16,557	42,118	11	12,648	29,459	.42
October	12,411	0	764	12,640	−993	0	−993	0	0	0	0	.00
Total	577,551	43,072	57,935	107,458	369,086	406	144,271	224,409	43	69,553	154,813	2.22
Acre-feet per acre					5.30	0.01	2.07	3.22	0.00	1.00	2.22	
Percent net supply					100	0	39	61	0	19	42	

[1] Acres irrigated, 69,694.

HIGH LINE CANAL[2]

Month	Diverted from main canal	Delivered to—			Net supply	Main canal losses	Delivered to laterals	Lateral losses	Delivered to farms	
		Reservoir No. 1	Reservoir No. 3	Low line					Total	Per acre
April	3,064	72	2,742		250	250	0	0	0	0.00
May	6,584	168	2,772	110	3,534	1,804	1,730	422	1,308	.14
June	11,816	150	654	119	10,893	4,257	6,636	1,458	5,178	.54
July	13,274	6	179	46	13,043	5,935	7,108	1,253	5,855	.61
August	11,710	30	451	86	11,143	4,763	6,380	1,080	5,300	.56
September	10,723	180	2,491	169	7,883	3,569	4,314	673	3,641	.38
October	764	12	338	0	414	414	0	0	0	.00
Total	57,935	618	9,627	530	47,160	20,992	26,168	4,886	21,282	2.23
Acre-feet per acre					4.93	2.19	2.74	0.51	2.23	
Percent, net supply					100	45	55	10	45	

[2] Acres irrigated, 9,559.

Monthly water distribution, Pathfinder Irrigation District, 1950—Continued

RESERVOIR SUPPLY CANAL[3]

	Diverted from reservoir No. 1	Delivered to—		Net supply	Main canal losses	Delivered to laterals	Diverted from Winter's Creek	Lateral losses	Delivered to farms	
		Winter's Creek Reservoir	Reservoir No. 3						Total	Per acre
March	4,102	0	3,778	324	324	0	0	0	0	0.00
April	26,914	0	25,912	1,002	1,002	0	0	0	0	.00
May	10,916	790	7,145	2,981	+297	3,278	132	1,431	1,979	.24
June	9,694	0	3,744	5,950	132	5,818	380	2,287	3,911	.47
July	7,946	0	264	7,682	908	6,774	542	2,186	5,130	.62
August	9,026	0	310	8,716	586	8,130	728	2,293	6,565	.79
September	11,748	0	6,352	5,396	658	4,738	368	1,246	3,860	.47
October	13,550	0	12,876	674	674	0	0	0	0	.00
Total	93,896	790	60,381	32,725	3,987	28,738	2,150	9,443	21,445	2.59
Acre-feet per acre				3.95	0.48	3.47	0.26	1.14	2.59	
Percent net supply				100	12	88	7	29	66	

[3] Acres irrigated, 8,287.

LOW LINE CANAL[4]

Month	Diverted from reservoir No. 3	Inflow from high line	Net supply	Main canal waste	Main canal losses	Delivered to laterals	Lateral losses	Delivered to farms	
								Total	Per acre
May	4,770	110	4,880	70	2,524	2,286	804	1,482	0.10
June	14,724	119	14,843	214	5,235	9,394	3,442	5,952	.41
July	19,570	46	19,616	138	7,598	11,880	3,435	8,445	.57
August	17,169	86	17,255	90	6,873	10,292	4,068	6,224	.42
September	8,966	169	9,135	370	3,705	5,060	895	4,165	.28
Total	65,199	530	65,729	882	25,935	38,912	12,644	26,268	1.78
Acre-feet per acre			4.46	0.06	1.76	2.64	0.86	1.78	
Percent net supply			100	1	40	59	19	40	

[4] Acres irrigated, 14,723.

SEEPAGE AND DRAINAGE

Total diversions were the second highest in the history of the project, and the total delivery to farms was the highest of all project records. This, naturally, caused excessive seepage and although acres seeped was not as great as some of the earlier years the seeped area was bad compared to the recent years. The Dutch Flats seep area is the worst seep problem at this time.

Very little muddy water and silt was noticeable in the diversion canal and this condition is always followed by heavy loss of water.

A few new drains were constructed and the usual amount were cleaned.

Area affected by seep the past 20 years is as follows:

	Acres		*Acres*		*Acres*
1931	3,141	1938	2,995	1945	2,556
1932	3,243	1939	2,634	1946	2,740
1933	3,764	1940	2,290	1947	2,740
1934	2,322	1941	2,654	1948	2,877
1935	2,322	1942	3,294	1949	3,046
1936	2,317	1943	2,973	1950	3,152
1937	2,585	1944	2,501		

All three electric pumps were operated on Dutch Flats as follows:

Pump No. 1.—Operated from May 5 to November 10; pumped 544 acre-feet.

Pump No. 2.—Operated from June 13 to October 29; pumped 385 acre-feet.

Pump No. 3.—Operated from May 5 to October 26; pumped 425 acre-feet.

Drains cleaned were as follows:

	Feet
By hand:	
Dutch Flats	28,400
Dechert	10,750
McProud	5,640
Kelly	15,040
Total	59,830
With dragline:	
Sheep Creek	3,970
Sunflower	2,040
Tub Springs	1,360
Dunham-Andrews	1,775
Wet Spotted Tail	600
Winters Creek	1,350
Kelly	1,225
Wild Horse	5,600
Total	17,920

New drains constructed with dragline are as follows:

Open drain:	
Sheep Creek	1,600
Sunflower	2,900
Fertig	3,450
Spotted Tail	700
Total	8,650
Tile drain:	
Sheep Creek	960
Sunflower	1,200
Total	2,160

LOSSES PAST 10 YEARS

The percent of seepage losses in the canal and lateral system for the season in comparison with those in former seasons are shown in the following table:

	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Main canal 95 mile	27	29	30	27	24	27	26	27	25	25
First and second lateral districts	38	32	31	30	27	33	27	30	29	31
High line canal and laterals	37	41	42	35	40	46	39	47	36	45
Reservoir No. 1	18	12	17	13	11	21	14	9	10	13
Reservoir supply canal and laterals	11	20	24	17	23	19	17	21	17	14
Reservoir No. 3	15	2	Gain	Gain	Gain	Gain	Gain	Gain	Gain	2
Low line canal and laterals	67	65	59	57	50	56	54	58	57	59
Grand total	59	59	56	53	51	53	51	53	50	53

OPERATION AND MAINTENANCE

The canal and lateral cleaning was about normal and two district-owned draglines and four tractors were used for this work. The draglines were operated on a double shift in the spring and by May 1 most laterals were ready for operation. This was the first spring in the past several years that we were able to clean all canals and laterals without hiring some machines.

Water was turned into the canal 12 a. m. March 21 and reached Lake Alice 8:45 p. m. March 24. The canal was in good shape and very little trouble was encountered taking the water through.

The demand for water was light until about the 10th of June when demands started to increase and by the 15th of June the canal discharge at Whalen was 1,950 second-feet. This was very early compared to past years and was due to the dry spring. This heavy demand continued the remainder of the season up to September 10.

The moss conditions were slightly above normal with several days of dragging done in August on the low line canal.

Deliveries were as follows:

	First	Last		First	Last
Main canal	Mar. 21	Sept. 29	Reservoir supply canal	Mar. 26	Oct. 20
Main canal laterals	May 3	Sept. 30	Reservoir supply laterals	May 9	Sept. 30
High line canal	Apr. 19	Oct. 3	Low line canal	May 15	Sept. 30
High line laterals	May 16	Sept. 30	Low line laterals	May 18	Sept. 30

There were 132 miles of canal banks sprayed to kill weeds, 137 miles mowed and the lower bank at Lake Minatare together with several miles of canal banks seeded with crested wheat. Eleven miles of upper banks and twenty-two miles of lower banks of the main canal were graded and over a mile of canal banks graveled. This is in addition to the report on page 23.

One ditchrider's house was built and another one nearly completed.

The only serious trouble was a large flood August 25 which destroyed 75 feet of Wildhorse siphon on the high line and damaged several other structures also canal banks in that area.

Two girls were drowned in the canal August 13 when the car in which they were riding drove into the canal west of Fort Laramie. Water was turned out of the canal a short time to recover the bodies; however, this upset the irrigation system for a week or more.

The following page gives a detailed report of structural work during the year. There were 355 structures built, replaced, or repaired on the project during the past season, as follows:

	New	Replaced	Repaired		New	Replaced	Repaired
Main canal headgates		1	18	Canal bridges			2
Lateral headgates	17		8	Drain bridges			8
Farm gates	8	4	3	Other bridges	4	3	8
Main canal checks			17	Road crossings	12	4	17
Other checks	15	7	14	Flumes	2		1
Siphons			6	Auto gates	3		1
Overflows			3	Underdrains			2
Drops	11	7	32				
Weirs	14	5	3	Total	105	59	191
Weir crests	19	28	48	Miles of fence			54

Riprap for channel protection placed during 1950, main canal

Mile		Gravel				Total	
		Upper bank		Lower bank			
From—	To—	Cubic yards	Miles	Cubic yards	Miles	Cubic yards	Miles
0	45.0	5,255	2.95	2,384	1.46	9,739	4.41
45.0	78.8	0	0	0	0	0	0
78.8	95.0	0	0	90	.03	90	.03
Total		5,355	2.95	2,474	1.49	9,829	4.44

Total miles main canal protection to date on inside slopes with rock and gravel

Mile		Gravel		Rock		Total
From—	To—	Upper bank	Lower bank	Upper bank	Lower bank	
0	45.0	21.89	29.61	4.26	4.71	60.47
45.0	78.8	12.05	24.05	.58	.30	36.98
78.8	95.0	16.58	12.67	1.78	.09	31.12
Total		50.52	66.33	6.62	5.10	128.57

COMPARATIVE CONSTRUCTION AND OPERATION AND MAINTENANCE CHARGES

The following table shows the operation and maintenance charge, also, construction charge the past 25 years. Class 5 lands were deferred from construction charges.

Year	O. and M. charge per acre	Construction charge per acre			
		Class 1	Class 2	Class 3	Class 4
1926		$3.00	$2.50	$1.75	$1.00
1927	$1.60	3.00	2.50	1.75	1.00
1928	1.60	3.00	2.50	1.75	1.00
1929	1.60	3.00	2.50	1.75	1.00
1930	1.80				
1931	1.70				
1932	1.50				
1933	1.10	[1]	[1]	[1]	[1]
1934	1.25	[1]	[1]	[1]	[1]
1935	1.25	[1]	[1]	[1]	[1]
1936	1.25				
1937	1.35	1.25	1.05	.70	.35
1938	1.35	.55	.45	.35	.20
1939	1.30				
1940	1.30				
1941	1.20	.95	.80	.60	.25
1942	1.30	.75	.60	.40	.20
1943	1.35	.75	.60	.40	.20
1944	1.45	.85	.70	.50	.30
1945	1.55	1.00	.90	.80	.65
1946	1.65	1.55	1.30	1.05	.80
1947	1.95	1.80	1.50	1.20	.90
1948	2.10	2.05	1.85	1.50	1.10
1949	2.10	2.05	1.85	1.50	1.10
1950	2.00	2.55	2.35	2.00	1.60
Total	36.60	28.10	23.95	18.00	11.65
Average [2]	1.525	1.277	1.088	.818	.529

[1] Moratorium.
[2] The average given for the operation and maintenance is over a period of 24 years and for the construction over a period of 22 years.

The operation and maintenance charge for 1926 was $0.50 per acre for the last half of the year; the Government operated the first half of the year.

Records on the following table show crop acreage comparison for the past 20 years. This table shows the large increase of row crops and the decrease of hay and small grain, especially the hay acreage. This continues to be a water problem in July and August when such a large acreage of row crops are to be watered.

Area cropped, 6 major crops, past 20 years

Year	Alfalfa hay	Barley	Beans	Beets	Corn	Oats	Potatoes
1931	21,820	11,901	1,784	10,820	18,781	2,752	12,915
1932	19,098	11,022	1,664	11,135	20,389	3,648	13,057
1933	17,294	8,413	2,920	15,900	16,016	5,056	9,096
1934	15,726	8,018	3,897	10,041	10,250	5,664	11,828
1935	15,356	6,674	2,947	7,747	20,839	6,114	11,810
1936	14,383	8,066	4,087	11,019	13,087	8,052	10,167
1937	12,346	5,416	8,418	9,406	19,891	6,100	10,313
1938	9,989	7,759	8,558	11,445	17,377	6,495	10,615
1939	9,287	7,743	7,582	8,143	16,725	5,538	11,416
1940	7,828	7,999	9,238	9,169	17,673	3,812	10,647
1941	10,292	7,528	11,043	8,399	18,198	5,242	9,114
1942	13,143	6,990	14,580	11,999	12,698	5,004	8,464
1943	13,842	7,618	22,253	6,121	11,136	3,951	8,791
1944	15,229	8,958	21,225	7,696	11,481	4,515	9,032
1945	13,567	9,796	19,205	9,349	8,402	4,341	7,695
1946	13,432	11,939	22,783	7,190	6,641	4,263	7,687
1947	12,408	12,633	24,565	8,886	4,265	4,022	5,996
1948	12,811	13,641	25,249	6,053	5,606	4,146	6,222
1949	12,773	13,161	25,816	5,577	9,017	3,366	5,499
1950	12,032	12,787	19,579	8,079	8,858	3,840	7,303

Crop returns per acre, by class, 1928 to 1950, inclusive

Year	Class 1	Class 2	Class 3	Class 4	Class 5	Total
1928	56.35	40.92	31.29	16.57	9.28	26.84
1929	61.29	56.25	42.74	24.76	15.07	36.8[illegible]
1930	61.40	50.39	34.79	20.37	11.84	31.3[illegible]
1931	41.41	29.49	19.81	10.57	6.11	18.0[illegible]
1932	29.38	19.95	14.97	7.41	4.00	12.90
1933	43.84	36.24	25.99	15.46	9.28	23.98
1934	34.76	28.32	22.08	13.60	7.45	19.91
1935	37.57	29.67	21.10	13.61	7.03	20.10
1936	65.25	52.94	39.41	24.77	12.76	37.34
1937	48.71	39.79	31.41	19.09	9.03	27.73
1938	42.62	31.40	25.00	14.77	7.29	22.25
1939	48.07	39.07	31.36	17.35	7.07	26.85
1940	36.89	28.84	23.35	13.41	5.20	19.96
1941	60.35	49.02	38.56	22.53	9.97	32.99
1942	68.32	60.25	46.00	25.72	10.10	38.00
1943	101.94	81.83	62.24	35.36	16.20	52.45
1944	89.09	74.93	58.44	34.10	15.59	51.78
1945	85.47	76.27	61.23	37.21	17.74	52.75
1946	127.50	110.58	86.50	51.25	19.93	70.67
1947	107.67	92.51	67.16	40.03	15.08	55.78
1948	96.83	87.68	67.14	40.87	16.95	55.03
1949	81.78	73.00	55.33	35.37	20.81	48.21
1950	95.03	74.48	52.47	28.01	15.10	46.46

Crop-yield report, Pathfinder irrigation district, 1950

TOTAL

	Acres	Unit of yield	Yield		Value		
			Total	Average	Per unit	Total	Per acre
CROP							
Beets	8,079	Ton	114,362	14.2	$9.38	$1,072,715.56	$132.78
Beet tops	(8,079)	do	114,362	14.2	.10	11,436.20	1.42
Barley	12,787	Bushel	265,026	20.7	1.00	265,026.00	20.73
Corn	8,858	do	272,626	30.8	.90	245,363.40	27.70
Oats	3,840	do	66,683	17.4	.80	53,346.40	13.89
Rye	578	do	4,656	8.1	1.00	4,656.00	8.06
Wheat	1,080	do	12,087	11.2	1.80	21,756.60	20.14
Spelts	19	do	334	17.6	1.00	334.00	17.58
Beans	19,579	do	492,654	25.2	2.55	1,256,267.70	64.16
Potatoes	7,303	do	2,095,746	287.0	.20	419,149.20	57.39
Alfalfa hay	12,032	Ton	24,438	2.0	12.00	293,256.00	24.37
Native hay	139	do	215	1.5	12.00	2,580.00	18.56
Other hay	1,503	do	850	.6	6.00	5,100.00	3.39
Cane	192	do	209	1.1	5.00	1,045.00	5.44
Corn fodder	317	do	645	2.0	3.50	2,257.50	7.12
Corn silage	1,446	do	12,445	8.6	3.50	43,557.50	30.12
Alfalfa seed	35	Bushel	75	2.1	24.00	1,800.00	51.43
Sweetclover seed	106	do	328	3.1	12.00	3,936.00	37.13
Millet seed	30	do	130	4.3	1.00	130.00	4.30
Pasture:							
Alfalfa	282	Acre			6.00	1,692.00	6.00
Sweetclover	635	do			3.00	1,905.00	3.00
Miscellaneous	7,661	do			1.50	11,491.50	1.50
Garden	262	do			25.00	6,550.00	25.00
Peas	36	Ton	87	2.4	55.00	4,785.00	132.91
Safflower	782	Bushel	12,926	16.5	1.68	21,715.68	27.77
Seeding:							
Alfalfa	(2,762)						
Sweetclover	(5,258)						
Total acreage reported	103,680						
Less duplicated area	16,099						
Acres cropped	87,581						
Beets, 1949:							
Federal		Ton	83,168		2.38	197,939.84	
Factory		do	83,168		1.43	118,930.24	
Grand total	87,581					4,068,722.32	46.46

Crop-yield report, Pathfinder irrigation district, 1950—Continued

TOTAL—Continued

	Acres	Unit of yield	Yield		Value		
			Total	Average	Per unit	Total	Per acre
MISCELLANEOUS							
Buildings, roads, etc.	4,138						
Other idle lands of units farmed	7,066						
Total irrigated	98,785						
Acres of units not farmed	13,584						
Grand total area	112,369						
Number of farms	1,353						

CLASS I

CROP							
Beets	1,922	Ton	31,082	16.2	$9.38	$291,549.16	$151.69
Beet tops	(1,922)	do	31,082	16.2	.10	3,108.20	1.62
Barley	1,372	Bushel	52,192	38.0	1.00	52,192.00	38.04
Corn	359	do	20,230	56.4	.90	18,207.00	50.72
Oats	47	do	1,870	39.8	.80	1,496.00	31.83
Beans	1,696	do	58,715	34.6	2.55	149,723.25	88.28
Potatoes	1,000	do	366,094	366.1	.20	73,218.80	73.22
Alfalfa hay	743	Ton	1,796	2.4	12.00	21,552.00	29.01
Corn silage	146	do	2,086	14.3	3.50	7,301.00	50.01
Pasture:							
Alfalfa	5	Acre			6.00	30.00	6.00
Sweetclover	6	do			3.00	18.00	3.00
Miscellaneous	78	do			1.50	117.00	1.50
Garden	15	do			25.00	375.00	25.00
Peas	36	Ton	87	2.4	55.00	4,785.00	132.92
Seeding:							
Alfalfa	(237)						
Sweetclover	(729)						
Safflower	10	Bushel	120	12.0	1.68	201.60	20.16
Total acreage reported	10,323						
Less duplicated area	2,888						
Acres cropped	7,435						
Beets, 1949:							
Federal		Ton	21,704		2.38	51,655.52	
Factory		do	21,704		1.43	31,036.72	
Grand total	7,435					706,566.25	95.03
MISCELLANEOUS							
Buildings, roads, etc.	285						
Other idle lands of units farmed	207						
Total irrigated	7,927						

Crop-yield report, Pathfinder irrigation district, 1950—Continued

CLASS II

	Acres	Unit of yield	Yield		Value		
			Total	Average	Per unit	Total	Per acre
CROP							
Beets	2,706	Ton	40,202	14.9	$9.38	$377,094.76	$139.36
Beet tops	(2,706)	do	40,202	14.9	.10	4,020.20	1.49
Barley	2,413	Bushel	71,619	29.7	1.00	71,619.00	29.68
Corn	1,350	do	64,251	47.6	.90	57,825.90	42.83
Oats	374	do	12,465	33.3	.80	9,972.00	26.66
Wheat	18	do	200	11.1	1.80	360.00	20.00
Beans	4,103	do	128,818	31.4	2.55	328,485.90	80.06
Potatoes	1,843	do	638,450	346.4	.20	127,690.00	69.28
Alfalfa hay	2,104	Ton	5,037	2.4	12.00	60,444.00	28.73
Other hay	21	do	5	.2	6.00	30.00	1.43
Corn fodder	26	do	134	5.2	3.50	469.00	18.04
Corn silage	269	do	2,725	10.1	3.50	9,537.50	35.46
Pasture:							
Alfalfa	40	Acre			6.00	240.00	6.00
Sweetclover	13	do			3.00	39.00	3.00
Miscellaneous	341	do			1.50	511.50	1.50
Garden	28	do			25.00	700.00	25.00
Seeding:							
Alfalfa	(398)	do					
Sweetclover	(1,100)	do					
Safflower	64	Bushel	1,775	27.7	1.68	2,982.00	46.59
Total acreage reported	19,917						
Less duplicated area	4,204						
Acres cropped	15,713						
Beets, 1949:							
Federal		Ton	31,059		2.38	73,920.42	
Factory		do	31,059		1.43	44,414.37	
Grand total	15,713					1,170,355.55	74.48
MISCELLANEOUS							
Buildings, roads, etc	889						
Other idle lands of units farmed	657						
Total irrigated	17,259						

CLASS III

	Acres	Unit of yield	Yield		Value		
			Total	Average	Per unit	Total	Per acre
CROP							
Beets	2,247	Ton	29,160	13.0	$9.38	$273,520.80	$121.73
Beet tops	(2,247)	do	29,160	13.0	.10	2,916.00	1.30
Barley	3,167	Bushel	69,734	22.0	1.00	69,734.00	22.02
Corn	1,929	do	74,015	38.4	.90	66,613.50	34.53
Oats	695	do	16,139	23.2	.80	12,911.20	18.58
Wheat	155	do	2,176	14.0	1.80	3,916.80	25.27
Beans	5,561	do	143,846	25.9	2.55	366,807.30	65.96
Potatoes	2,013	do	584,908	290.6	.20	116,981.60	58.11
Alfalfa hay	3,432	Ton	6,870	2.0	12.00	82,440.00	24.02
Native hay	27	do	44	1.6	12.00	528.00	19.56
Other hay	49	do	46	.9	6.00	276.00	5.63
Corn fodder	11	do	42	3.8	3.50	147.00	13.36
Corn silage	341	do	3,112	9.1	3.50	10,892.00	31.94
Pasture:							
Alfalfa	32	Acre			6.00	192.00	6.00
Sweetclover	82	do			3.00	246.00	3.00
Miscellaneous	806	do			1.50	1,209.00	1.50
Garden	42	do			25.00	1,050.00	25.00
Seeding:							
Alfalfa	(669)	do					
Sweetclover	(1,272)	do					
Safflower	106	Bushel	1,668	15.7	1.68	2,802.24	26.44
Total acreage reported	24,883						
Less duplicated area	4,188						
Acres cropped	20,695						
Beets, 1949:							
Federal		Ton	19,062		2.38	45,367.56	
Factory		do	19,062		1.43	27,258.66	
Grand total	20,695					1,085,809.66	52.47

Crop-yield report, Pathfinder irrigation district, 1950—Continued

CLASS III—Continued

	Acres	Unit of yield	Yield		Value		
			Total	Average	Per unit	Total	Per acre
MISCELLANEOUS							
Buildings, roads, etc.	999						
Other idle lands of units farmed	941						
Total irrigated	22,635						

CLASS IV

CROP							
Beets	941	Ton	10,253	10.9	$9.38	$96,173.14	$102.20
Beet tops	(941)	do	10,253	10.9	.10	1,025.30	1.09
Barley	4,170	Bushel	51,576	12.4	1.00	51,576.00	12.37
Corn	3,632	do	83,886	23.1	.90	75,497.40	20.79
Oats	1,703	do	23,576	13.8	.80	18,860.80	11.08
Rye	354	do	3,236	9.1	1.00	3,236.00	9.14
Wheat	479	do	5,167	10.8	1.80	9,300.60	19.41
Beans	6,245	do	122,521	19.6	2.55	312,428.55	50.03
Potatoes	1,853	do	382,621	206.5	.20	76,524.20	41.30
Alfalfa hay	4,165	Ton	7,820	1.9	12.00	93,840.00	22.53
Native hay	60	do	102	1.7	12.00	1,224.00	20.40
Other hay	807	do	282	.3	6.00	1,692.00	2.10
Cane	106	do	96	.9	5.00	480.00	4.53
Corn fodder	117	do	266	2.3	3.50	931.00	7.96
Corn silage	441	do	2,850	6.5	3.50	9,975.00	22.62
Alfalfa seed	35	Bushel	75	2.1	24.00	1,800.09	51.43
Sweetclover seed	61	do	168	2.8	12.00	2,016.00	33.04
Pasture:							
Alfalfa	131	Acre			6.00	786.00	6.00
Sweetclover	125	do			3.00	375.00	3.00
Miscellaneous	2,836	do			1.50	4,254.00	1.50
Garden	72	do			25.00	1,800.00	25.00
Seeding:							
Alfalfa	(815)	do					
Sweetclover	(1,771)	do					
Safflower	389	Bushel	7,508	19.3	1.68	12,613.44	32.43
Spelts	19	do	334	17.6	1.00	334.00	17.58
Millet seed	30	do	130	4.3	1.00	130.00	4.33
Total acreage reported	32,298						
Less duplicated area	3,527						
Acres cropped	28,771						
Beets, 1949:							
Federal		Ton	7,612		2.38	18,116.56	
Factory		do	7,612		1.43	10,885.16	
Grand total	28,771					805,874.15	28.01
MISCELLANEOUS							
Buildings, roads, etc	1,232						
Other idle lands of units farmed.	2,864						
Total irrigated	32,867						

CLASS V

CROP							
Beets	95	Ton	1,047	11.0	$9.38	$9,820.86	$103.38
Beet tops	(95)	do	1,047	11.0	.10	104.70	1.10
Barley	1,422	Bushel	13,695	9.6	1.00	13,695.00	9.63
Corn	1,368	do	19,144	14.0	.90	17,229.60	12.59
Oats	915	do	11,187	12.2	.80	8,949.60	9.78
Rye	224	do	1,420	6.3	1.00	1,420.00	6.34
Wheat	406	do	3,794	9.3	1.80	6,829.20	16.82
Beans	1,495	do	26,333	17.6	2.55	67,149.15	44.92
Potatoes	455	do	70,095	154.1	.20	14,019.00	30.81
Alfalfa hay	1,238	Ton	2,088	1.7	12.00	25,056.00	20.24
Native hay	41	do	53	1.3	12.00	636.00	15.51
Other hay	582	do	447	.8	6.00	2,682.00	4.61
Cane	86	do	113	1.3	5.00	565.00	6.57

Crop-yield report, Pathfinder irrigation district, 1950—Continued

CLASS V—Continued

	Acres	Unit of yield	Yield		Value		
			Total	Average	Per unit	Total	Per acre
CROP							
Corn fodder	163	do	203	1.2	$3.50	$710.50	$4.36
Corn silage	239	do	1,568	6.6	3.50	5,488.00	22.96
Sweetclover seed	45	Bushel	160	3.6	12.00	1,920.00	42.67
Pasture:							
Alfalfa	66	Acre			6.00	396.00	6.00
Sweetclover	399	do			3.00	1,197.00	3.00
Miscellaneous	3,234	do			1.50	4,851.00	1.50
Garden	86	do			25.00	2,150.00	25.00
Seeding:							
Alfalfa	(575)	do					
Sweetclover	(356)	do					
Safflower	145	Bushel	1,250	8.6	1.68	2,100.00	14.48
Total acreage reported	13,730						
Less duplicated area	1,026						
Acres cropped	12,704						
Beets, 1949:							
Federal		Ton	1,267		2.38	3,015.46	
Factory		do	1,267		1.43	1,811.81	
Grand total	12,704					191,795.88	15.10
MISCELLANEOUS							
Buildings, roads, etc	645						
Other idle lands of units farmed	2,116						
Total irrigated	15,465						

NONCONSENTING AND WYOMING LANDS (PAYING CLASSES)

CROP							
Beets	168	Ton	2,618	15.6	$9.38	$24,556.84	$146.17
Beet tops	(168)	do	2,618	15.6	.10	261.80	1.56
Barley	190	Bushel	5,430	28.6	1.00	5,430.00	28.58
Corn	205	do	10,725	52.3	.90	9,652.50	47.09
Oats	44	do	531	12.1	.80	424.80	9.65
Wheat	22	do	750	34.1	1.80	1,350.00	61.36
Beans	368	do	10,427	28.3	2.55	26,588.85	72.25
Potatoes	125	do	48,978	391.8	.20	9,795.60	78.36
Alfalfa hay	259	Ton	639	2.5	12.00	7,668.00	29.61
Native hay	11	do	16	1.4	12.00	192.00	17.45
Other hay	44	do	70	1.6	6.00	420.00	9.55
Corn silage	10	do	104	10.4	3.50	364.00	36.40
Pasture:							
Alfalfa	8	Acre			6.00	48.00	8.00
Sweetclover	10	do			3.00	30.00	3.00
Miscellaneous	83	do			1.50	124.50	1.50
Garden	1	do			25.00	25.00	25.00
Seeding:							
Alfalfa	(42)	do					
Sweetclover	(30)	do					
Safflower	24	Bushel	405	16.9	1.68	680.40	28.35
Total area reported	1,812						
Less duplicated area	240						
Acres cropped	1,572						
Beets, 1949:							
Federal		Ton	2,161		2.38	5,143.18	
Factory		do	2,161		1.43	3,090.23	
Grand total	1,572					95,845.70	60.97
MISCELLANEOUS							
Buildings, roads, etc	74						
Other idle lands of units farmed	128						
Total irrigated	1,774						

Crop-yield report, Pathfinder irrigation district, 1950—Continued

NONCONSENTING AND WYOMING LANDS (CLASS V)

	Acres	Unit of yield	Yield		Value		
			Total	Average	Per unit	Total	Per acre
CROP							
Barley	53	Bushel	780	14.7	$1.00	$780.00	$14.72
Corn	15	do	375	25.0	.90	337.50	22.50
Oats	62	do	915	14.8	.80	732.00	11.81
Beans	111	do	1,994	18.0	2.55	5,084.70	45.81
Potatoes	14	do	4,600	328.6	.20	920.00	65.71
Alfalfa hay	91	Ton	188	2.1	12.00	2,256.00	24.79
Pasture, miscellaneous	283	Acre			1.50	424.50	0.50
Garden	18	do			25.00	450.00	25.00
Seeding, alfalfa	(26)	do					
Safflower	44	Bushel	200	4.5	1.68	336.00	7.64
Total acreage reported	717						
Less duplicated area	26						
Acres cropped	691						
Beets, 1949:							
Federal		Ton	303		2.38	721.14	
Factory		do	303		1.43	433.29	
Grand total	691					12,475.13	18.05
MISCELLANEOUS							
Buildings, roads, etc	14						
Other idle lands of units farmed	153						
Total irrigated	858						

NORTH PLATTE CANAL AND COLONIZATION CO.

CROP							
Beets	752	Ton	10,465	13.9	$9.38	$98,161.70	$130.53
Beet tops	(752)	Ton	10,465	13.9	.10	1,046.50	1.39
Barley	1,395	Bushel	24,829	17.8	1.00	24,829.00	17.80
Corn	273	Bushel	7,275	26.6	.90	6,367.50	23.32
Oats	814	Bushel	14,959	18.4	.80	11,967.20	14.70
Rye	5	Bushel	32	6.4	1.00	32.00	6.40
Wheat	71	Bushel	1,497	21.1	1.80	2,694.60	37.95
Beans	2,054	Bushel	48,613	23.7	2.55	123,963.15	60.35
Potatoes	494	Bushel	153,070	309.9	.20	30,614.00	61.97
Alfalfa hay	2,404	Ton	4,184	1.7	12.00	50,208.00	20.89
Other hay	492	Ton	477	1.0	6.00	2,862.00	5.82
Corn fodder	61	Ton	354	5.8	3.50	1,239.00	20.31
Corn silage	223	Ton	3,313	14.9	3.50	11,595.50	52.00
Pasture, miscellaneous	3,746	Acre			1.50	5,619.00	1.50
Garden	63	Acre			25.00	1,575.00	25.00
Total area reported	13,599						
Less duplicated area	752						
Acres cropped	12,847						
Beets, 1949:							
Federal		Ton	6,516		2.38	15,508.08	
Factory		Ton	6,516		1.43	9,317.88	
Grand total	12,847					397,600.11	30.95
MISCELLANEOUS							
Buildings, roads, etc	453						
Other idle lands of units farmed	993						
Total irrigated	14,293						
Acres of units not farmed	1,074						
Grand total area	15,367						
Number of farms operated	110						
Total population	371						

Cost of growing beets

[Based on actual yield per acre]

Operation	M. O. Andrews, Scottsbluff	H. A. Green, Scottsbluff	H. P. Gompert, Mitchell	Carl O. Meier, Minatare	Victor Ruppel, Scottsbluff	Dave Martin, Scottsbluff	J. H. Deines, Mitchell	R. L. Curry, Morrill	George Ruff, Mitchell
Acres	24.00	57.00	37.00	33.00	36.00	44.00	39.00	26.00	23.00
Plowing	$5.00	$5.00	$3.50	$1.50	$3.00	$3.50	$3.00	$3.00	$2.00
Fertilizer	45.25	45.25	30.00	15.00	8.50	3.00	4.00	5.00	.50
Disking	1.00	1.00	1.00	.75	1.00	2.00	2.50	2.50	.25
Leveling	1.00	1.00	1.00	.75	1.00	1.75	2.00	2.00	.25
Harrowing	1.00	1.00	1.50	.75	1.00	1.50	2.00	3.00	.20
Seed	3.00	3.00	3.00	2.50	3.00	3.00	2.70	3.29	2.50
Planting	1.50	1.50	1.50	.75	1.00	1.50	1.75	2.50	.25
Scarifying			5.00	1.50		4.00	2.25	2.50	
Thinning	14.00	14.00	13.50	13.00	13.00	13.00	13.50	13.50	13.00
Cultivating and ditching	7.00	7.00	6.00	3.75	4.00	3.75	9.75	12.50	1.00
Irrigating	15.00	15.00	13.00	4.50	15.00	7.50	3.75	2.00	4.00
Weeding and hoeing	9.50	9.50	8.00	5.50	5.50	7.50	7.50	7.50	8.50
Pulling and topping	51.00	51.00	52.00	27.75	31.50	22.00	23.77	22.50	23.00
Loading and hauling	16.00	14.00	18.00	33.25	18.00	15.00	21.00	24.00	9.00
Total	170.25	168.25	147.00	111.25	105.50	89.00	99.47	105.79	64.45
Tons per acre	16.00	11.00	18.00	19.00	18.00	12.00	17.00	14.00	23.00

Cost per acre, 9 farms, $121.04; cost per ton, 9 farms, $7.67.

Cost of growing potatoes

[Based on actual yield per acre]

Operation	Alex Schwab, Scottsbluff	Wilmer L. Porchet, Mitchell	Alex Margheim, Mitchell	Dave F. Martin, Scottsbluff	Alex Kaufman, Minatare	Carl O. Meier, Minatare	Adam Kerbel, Jr., Morrill	James Franks, Morrill	Clarence Johnson, Morrill
Acres	47	37	26	21	17	25	16	47	37
Plowing	$4.00	$2.50	$3.50	$4.50	$2.50	$1.50	$4.00	$4.00	$3.00
Manuring		13.00	11.00		14.00	15.00	10.00		4.50
Discing	.75	.75	.60	2.00	1.00	.75	.75	2.50	3.00
Leveling	.75		.50	1.75	.50	.75	.50		
Harrowing	1.25	.50	2.00	1.50	.50	.75	.50	2.50	1.00
Rolling		.75		1.50	1.00	.75	.50		
Planting	4.00	8.00	4.00	5.00	5.00	2.00	2.00	3.50	5.00
Seed	35.00	25.00	37.00	24.00	35.75	37.50	52.00	55.00	37.50
Cutting seed	1.40	2.50	4.50	3.00	2.50	2.50	2.60	4.80	3.00
Treating seed	3.50	1.00	3.00	3.60		1.50	1.30	1.60	1.50
Cultivating and ditching	3.00	3.00	2.50	3.75	4.00	3.00	3.00	6.40	8.40
Irrigating	8.50	5.50	4.60	7.50	5.00	4.50	2.10	10.00	6.40
Spray and spraying	8.00	4.25	8.10	6.00	6.00	6.05	10.00	13.00	6.00
Hoeing		1.50	1.00	2.00	3.00	2.50	1.00	2.50	4.00
Digging	7.00	5.00	4.00	6.00	5.00	5.00		5.00	4.50
Picking	40.00	28.00	43.75	28.00	36.00	35.00	32.00	40.00	40.00
Sorting and sacking	21.00	31.00	14.00	3.00	33.00	34.00	12.00	15.60	24.00
Sacks	1.00	48.60	50.00	2.00	53.00	76.00		3.26	90.00
Hauling	45.00	16.50	37.50	28.00	20.00	61.00	20.00	40.00	
Total	184.15	197.35	231.55	133.10	227.75	290.05	154.25	209.66	241.80
Bushels per acre	500	325	625	350	400	440	400	400	500

Cost per acre, 9 farms, $200.53; cost per bushel, 9 farms, $0.45.

Comparative average value of crops, past 25 years

Year	Number of farms	Acres cropped	Value per acre	Value per farm	Year	Number of farms	Acres cropped	Value per acre	Value per farm
1926	1,338	84,248	$31.63	$1,991.52	1939	1,297	80,958	$26.85	$1,675.80
1927	1,418	87,873	29.02	1,797.61	1940	1,312	82,166	21.10	1,321.15
1928	1,417	89,894	26.84	1,703.03	1941	1,345	86,621	32.99	2,124.94
1929	1,376	87,995	36.85	2,366.37	1942	1,347	88,531	38.00	2,490.09
1930	1,358	90,518	31.33	2,088.64	1943	1,362	89,942	52.54	3,469.54
1931	1,409	90,427	18.02	1,156.32	1944	1,268	87,329	51.78	3,565.85
1932	1,339	88,642	12.90	853.78	1945	1,243	83,845	52.75	3,558.40
1933	1,294	81,446	23.98	1,509.08	1946	1,371	91,713	70.67	4,727.21
1934	1,255	78,360	19.91	1,243.58	1947	1,372	96,038	55.78	3,904.58
1935	1,242	81,744	20.10	1,322.64	1948	1,340	92,689	55.03	3,806.47
1936	1,190	76,650	37.34	2,404.88	1949	1,392	89,758	48.21	3,108.76
1937	1,270	82,186	27.73	1,794.40	1950	1,353	87,581	46.46	3,007.19
1938	1,297	83,174	22.25	1,458.50					

Comparative yields and averages, past 20 years

Year	Alfalfa hay	Barley	Beans	Beets	Corn	Oats	Potatoes	Wheat
1931	1.5	26.3	13.0	13.3	16.4	26.2	163.3	5.9
1932	1.9	39.6	12.7	14.1	20.8	38.5	109.3	10.5
1933	1.9	24.1	16.4	12.5	19.9	25.4	161.4	8.8
1934	1.4	23.0	6.5	8.2	11.7	21.4	92.6	7.9
1935	1.8	32.5	18.1	12.2	20.6	36.3	160.1	9.8
1936	1.8	16.9	20.6	11.0	21.7	14.9	124.5	3.2
1937	1.6	33.3	25.1	15.1	22.8	28.9	208.4	14.0
1938	1.7	30.2	18.2	13.9	24.4	27.9	120.1	22.6
1939	1.7	22.8	22.0	10.9	21.9	15.9	191.6	12.0
1940	1.5	29.6	18.7	12.7	20.4	23.5	175.2	13.0
1941	2.1	43.5	24.2	15.9	29.2	39.6	186.7	21.3
1942	2.2	25.7	21.6	10.8	12.8	18.4	215.3	14.6
1943	2.0	29.5	23.5	12.7	19.5	24.1	170.6	18.5
1944	1.9	26.1	17.1	10.8	22.5	25.2	156.5	11.6
1945	1.8	26.3	22.3	11.5	18.5	23.9	196.7	21.8
1946	1.9	37.1	27.5	14.0	24.3	30.3	226.2	18.7
1947	1.7	10.5	19.0	10.8	13.4	14.0	186.6	8.8
1948	2.0	23.9	26.0	13.1	25.4	17.4	252.3	11.8
1949	2.1	31.4	22.6	14.9	32.8	26.1	248.3	13.9
1950	2.0	20.7	25.2	14.2	30.8	17.4	287.0	11.2
Average	1.8	27.6	20.1	12.6	21.7	25.0	181.6	13.0

Livestock census, past 20 years

Year	Horses and mules	Cattle	Sheep	Hogs	Fowl
1931	4,272	9,977	1,670	10,923	94,811
1932	4,121	9,555	1,609	8,710	81,928
1933	3,816	8,880	1,001	6,925	77,909
1934	3,905	8,599	2,165	6,249	82,508
1935	3,523	8,298	1,084	2,894	67,237
1936	3,484	6,787	2,199	4,763	73,311
1937	3,402	7,331	1,640	3,400	68,247
1938	3,221	6,412	3,319	2,989	71,562
1939	2,901	5,137	2,357	5,792	82,670
1940	2,877	5,628	2,150	4,623	76,063
1941	2,594	6,582	3,574	5,577	78,484
1942	2,717	7,618	3,038	8,622	97,481
1943	2,683	11,312	2,927	17,628	114,174
1944	2,223	6,563	3,298	5,134	88,020
1945	1,922	8,657	2,258	5,800	76,586
1946	1,583	7,080	857	3,446	67,311
1947	1,100	6,520	5,784	3,390	58,389
1948	915	8,449	4,050	3,761	44,288
1949	754	7,878	3,151	3,995	43,390
1950	607	6,142	2,323	4,138	34,700

Livestock on feed

Year	Cattle	Sheep	Year	Cattle	Sheep
1931	1,200	65,000	1941	3,359	75,518
1932	1,500	71,000	1942	2,690	64,190
1933	1,775	70,800	1943	2,748	(1)
1934	1,400	8,500	1944	5,362	38,647
1935	2,201	92,317	1945	3,817	48,004
1936	3,787	40,597	1946	3,201	25,479
1937	4,088	109,365	1947	3,336	37,350
1938	2,419	62,720	1948	2,413	3,303
1939	4,602	83,044	1949	8,222	46,255
1940	4,781	66,634	1950	6,246	25,546

[1] No report.

Stock yield and equipment report, Pathfinder irrigation district, 1950

Item	Inventory, Nov. 1, 1949			Inventory, Nov. 1, 1950			Increased total value
	Number	Value	Total value	Number	Value	Total value	
Horses and mules	754	$50.00	$37,700.00	607	$50.00	$30,350.00	−$7,350
Cattle:							
Beef	4,491	90.00	444,690.00	3,454	150.00	518,100.00	73,410
Range feeders	8,222	110.00	904,420.00	6,246	175.00	969,050.00	64,630
Dairy	2,597	130.00	337,610.00	2,463	200.00	492,600.00	154,990
Purebred sires	172	175.00	30,100.00	113	300.00	33,900.00	3,800
Scrub sires	168	75.00	12,600.00	112	200.00	22,400.00	9,800
Sheep:							
Farm flock	3,151	10.00	31,510.00	2,323	15.00	34,845.00	3,335
Range feeders	46,255	12.00	555,060.00	25,546	12.00	306,552.00	−248,508
Hogs	3,995	20.00	79,900.00	4,138	25.00	103,459.00	23,559
Turkeys	374	6.00	2,244.00	214	5.00	1,070.00	−1,174
Chickens	43,016	.80	34,412.80	34,486	.80	27,588.80	−6,824
Other livestock or fowl			1,838.00			1,803.00	−35
Hives of bees	41		205.00	24		120.00	−85
Total			2,472,289.80			2,541,837.80	69,548
Motor vehicles			944,737.00			823,715.00	−121,022
Farm equipment			1,451,647.00			1,350,050.00	−101,597
Grand total			4,868,673.80			4,715,602.80	−153,071

Land investment report, Pathfinder irrigation district (including nonconsenting and nondistrict lands, 1950

[Acres, 98,785]

Item	Total value		Increased value
	Jan. 1	Dec. 31	
Area cleared and leveled (87,581 acres)	$448,790	$437,935	−$10,855
Alfalfa and sweet clover stand (21,110 acres)	107,840	105,550	−2,290
Other improvements	2,000,000	2,000,000	0
Paid construction charges	4,766,394	4,956,108	189,714
Purchase price of land	3,400,000	3,400,000	0
Total, gross land investment	10,723,024	10,899,593	176,569
Total, gross land value	10,226,300	9,878,500	−347,800
Unpaid delinquent construction charges	47,794	81,719	−33,925
Unpaid future construction charges	5,092,264	4,912,550	179,714
Total, unpaid construction charges	5,140,058	4,994,269	145,789

Average price per acre of unimproved land of project without water right	$5
Average price per acre of improved land of project without water right	15
Average price per acre of improved land of project with paid-up water right	100

Farm summary, Pathfinder irrigation district, 1950

Item	This year			Previous year			Increase		
	Total	Per farm	Per acre	Total	Per farm	Per acre	Total	Per farm	Per acre
Number of farms reported	1,353			1,392			−39		
Irrigable acreage of farms reported	98,785	73		102,263	76		−3,478	−3	
Irrigated acreage of farms under water right application	98,229	73		101,546	70		−3,317	3	
Under rental contracts, etc.	556	50		717	36		−161	14	
Total	98,785	73		102,263	76		−3,478	−3	
Cropped acreage of farms reported	87,581	65		89,758	64		−2,177	1	
CROPPED									
Total crop yield	$4,068,722	$3,007	$46.46	$4,327,387	$3,109	$48.21	−$258,665	−$101	−$1.75
IRRIGABLE									
Total stock increase	$67,745	$50.07	$0.69						
Inventory of stock and equipment	4,713,799	3,484	47.71	$4,868,673	$3,497	$47.61	−$154,874	−$13	$0.10
Total gross land investment	10,899,593	8,055	110.33	10,723,024	7,703	104.85	176,569	352	5.48
Total gross investment	15,613,392	11,539	158.04	15,591,697	11,200	152.46	21,695	339	5.58
Total gross land value	9,878,500	7,301	100.00	10,226,300	7,346	100.00	−347,800	−45	0

Status of water users, Pathfinder irrigation district, 1950

Item	Number	Item	Number
Total irrigable farms and farm units (112,639 acres)	1,546	Capital stock	$550,000.00
Farms actually irrigated (98,785 acres)	1,353	Deposits	$25,127,241.18
Farms irrigable but not irrigated (13,584 acres)	193	Churches	43
Irrigated farms operated by owners or managers	683	Towns (entire project)	6
Irrigated farms operated by tenants	670	Total population of towns on project	18,959
Population of irrigated farms	2,782	Population of towns individually:	
Average population on irrigated farms per farm	2.1	Scottsbluff	12,833
Public schools (entire project)	40	Mitchell	2,078
Banks	6	Bayard	1,870
		Minatare	1,125
		Morrill	877
		Henry	176

General summary of operation and maintenance results, Pathfinder irrigation district (including nonconsenting and Wyoming lands), from 1946 to 1950

Item	1946	1947	1948	1949	1950
Acre-feet of water diverted	505,090	463,880	540,893	539,370	577,551
Acre-feet of water delivered to farms	200,587	188,642	205,988	215,645	223,808
Acre-feet delivered per acre irrigated	1.91	1.79	1.99	2.11	2.26
Miles of canal operated	805	805	805	805	805
Acreage irrigable	112,943	112,943	112,943	112,369	112,369
Acreage irrigated	104,831	105,433	103,577	102,263	98,785
Number of farms irrigated	1,408	1,372	1,340	1,392	1,353
Acreage cropped under irrigation	94,246	96,038	92,689	89,758	87,581
Value of irrigated crops, total	$6,660,627	$5,357,084	$5,100,429	$4,327,387	$4,068,722
Value of irrigated crops per acre cropped	$70.67	$55.78	$55.03	$48.21	$46.46
Value of irrigated crops per farm	$4,730	$3,905	$3,905	$3,109	$3,007
Populations on farms, total	3,677	3,389	3,281	3,254	2,782
Population on farms per farm	2.6	2.5	2.4	2.4	2.1
Owners on farms	594	659	689	685	683
Tenants on farms	814	713	651	707	670
Stock value per farm	$918	$1,353	$1,019	$1,776	$1,877
Cost of operation and maintenance, total	$175,275	$184,868	$174,150	$206,451	$208,894
Cost of operation and maintenance per acre irrigable	$1.55	$1.64	$1.54	$1.84	$1.86
Cost of operation and maintenance, per acre irrigated	$1.67	$1.92	$1.68	$2.01	$2.11

SECRETARY-TREASURER'S REPORT, 1950

During the year 1950, the board of directors of the Pathfinder irrigation district held a total of 20 meetings. These meetings consisted of 12 regular meetings and 8 special meetings, including those required by law for canvassing votes, organization of the board, and equalization meetings.

In compliance with the law, the board of directors sat as an equalization board for 3 days beginning May 23 and continuing through May 25, 1951, at which time 17 persons appeared with their requests for adjustments in assessments and reclassification.

In addition to these meetings there were again several joint meetings held in 1950. The officials of the Pathfinder irrigation district met jointly with officials from Goshen and Gering-Ft. Laramie irrigation districts. These meetings were held to discuss the matter of the disposal of our power interests in the North Platte project to the United States and the progress of the negotiations.

At various times during the year informal meetings were held with Bureau of Reclamation officials from Denver, Capser, and Guernsey. They met with members of our board concerning irrigation problems arising during the year, pertaining to the Bureau and the districts, also, concerning the problem of land reclassification.

One director is elected each year to serve as a member of the board and an election was held in division No. 2 of the Pathfinder irrigation district at Victory Hill School House, February 7, 1950. As a result of this election M. O. Andrews received the most votes and was, therefore, re-elected to serve that division for a period of 3 years. The directors met on February 16, 1950, to organize as a board. A. E. Boggs was appointed president, and Emily M. Knoepfel was appointed secretary-treasurer and assessor for the ensuing year. At this meeting the Scottsbluff Daily Star-Herald was designated as the official paper for 1950.

During the month of January an audit of the district's books was completed by auditors from the Bureau of Reclamation. They reported all accounts in order.

Early in March the district entertained at a dinner for all employees at the American Legion Hall. A discussion was held and various talks given.

On April 8 and October 8, bids were submitted and contracts entered into for the purchase of materials and supplies used by the district. The items on which bids were called were on gasoline, lubricants, and Diesel fuel.

The National Reclamation Convention was held on November 15, 16, and 17 at Spokane, Wash., with two board members and the manager in attendance.

At their regular meeting on December 5, 1950, the board discussed the 1951 operation and maintenance budget. After careful examination and study of the budget the charge was set at $2.10 per acre. Any current operation and maintenance charge delinquent July 15, 1951, will be certified to the county treasurer for collection together with State and county taxes.

During the course of the year 49 water users appeared before the board.

Financial statement for year 1950

Bonds on hand Jan. 1, 1950		$25,900.00
Balance on hand Jan. 1, 1950		68,522.88
Collections:		
1951 operation and maintenance collected	$19,935.65	
1950 operation and maintenance collected	177,593.78	
Prior operation and maintenance collected	213.24	
Certified operation and maintenance collected	3,673.24	
Cash collections	4,229.42	
Water right proof	12.00	
Lingle Water Users Association	6,937.00	
Hill irrigation district	2,277.98	
		214,872.31
		283,395.19

Disbursements:

Month	Payroll	Purchases	Total	
January	$5,717.01	$3,627.01	$9,344.02	
February	5,954.25	8,053.58	14,007.83	
March	6,982.35	6,234.77	13,217.12	
April	9,688.89	19,206.23	28,895.12	
May	13,590.90	27,498.31	41,089.21	
June	14,808.66	5,095.34	19,904.00	
July	13,987.59	4,267.79	18,255.38	
August	13,628.11	3,179.25	16,807.36	
September	13,010.97	6,434.81	19,445.78	
October	10,466.76	4,037.98	14,504.74	
November	6,646.16	3,793.60	10,439.76	
December	7,284.63	6,560.25	13,844.88	
Total	121,766.28	97,988.92	219,755.20	219,755.20
Balance on hand Jan. 1, 1951				63,639.99
Bonds on hand Jan. 1, 1951				25,900

Construction fund, balance sheet, Dec. 31, 1950

Cost to district of irrigation project		$9,048,356.40	
Less unaccured charges and currently due		4,912,550.29	
Cash equity in system			$4,135,806.11
Cash on hand with county treasurer's		$18,486.56	
Uncollected assessments		168,205.45	
Paid United States in advance		4,159.68	
			190,851.69
Total debits			4,326,657.80
Water right contracts	$9,045,122.91		
Reserve	40,472.94		
United States credits (power, grazing, etc.)	1,670,550.23		
Interest	8,409.94		
Collections in advance	4,249.68		
		10,768,805.70	
Unaccrued charges	4,755,943.59		
United States credits applied	1,665,612.71		
Interest paid United States	10,960.46		
Commission paid county treasurer's	3,048.22		
Miscellaneous prior	6,582.92		
Capitalized	4,135,806.11		
		10,577,954.01	
Net construction fund revenue			190,851.69
Paid United States on principal of construction liability			4,135,806.11
Total credits			4,326,657.80

North Platte project power system, sales and expense

	1948	1949	1950
Revenue customer:			
Wheatland	$27,281.97	$29,454.95	$31,094.22
Guernsey	8,762.94	9,062.18	9,836.00
Fort Laramie	2,007.40	2,223.54	2,295.02
Lingle	6,077.53	6,571.27	6,854.03
Torrington	43,540.44	46,882.54	52,844.97
Lyman	9,746.94	9,962.83	9,866.18
Gering	61,414.59	69,780.20	73,130.94
Morrill	20,509.27	23,643.19	26,160.96
Mitchell	19,439.28	22,710.36	24,465.91
Bayard	17,219.20	18,390.55	19,681.76
Wheatland R. E. A	15,431.12	21,230.61	24,553.07
Wyrulec R. E. A	36,798.25	43,341.88	51,248.21
Roosevelt R. E. A	26,754.77	29,404.31	32,258.17
Chimney Rock R. E. A	24,830.95	26,760.35	31,281.63
Consumers Public Power District	11,018.09	720.16	2,296.00
Holly Sugar Corp	3,513.34	3,433.20	3,673.60
E. S. Schroeder	3,413.25	6,217.03	7,791.66
Service Pipe Line Co	12,738.27	3,631.71	9,035.23
Colorado Fuel & Iron Co	58,245.00	55,125.17	53,519.44
Guernsey or Tobin Quarries	4,662.32	3,678.11	3,793.50
Kendrick project	11,636.55	9,095.93	2,543.85
Employees	1,136.79	1,136.92	1,286.58
Guernsey and Whalen Dams	386.32	367.50	258.43
Miscellaneous	148.45	145.13	213.70
Etlin E. Peterson	0.00	0.00	10.57
Total sales, electrical energy	426,713.03	442,969.62	479,993.63
Rental, electrical property	4,266.30	4,480.86	4,295.22
Forfeited discounts and penalties	0.00	18.87	47.67
Total operating revenue	430,979.33	447,469.35	484,336.52
Expenses:			
Operation and maintenance	179,489.19	179,577.12	229,853.87
Purchased power	53,234.74	87,569.36	99,222.59
Replacement reserve	60,000.00	60,000.00	60,000.00
Total operating deductions	292,723.93	327,146.48	389,076.46
Net operating revenue	138,255.40	120,322.87	95,260.06
Less uncollected	0.00	5,090.51	15,289.12
Plus collected	753.34	0.00	0.00
Net revenues	139,008.74	115,232.36	79,970.94

EXHIBIT C

Irrigation A National Asset

(Prepared by the Department of Industry and Agriculture of the Chicago, Burlington & Quincy R. R. Co., Chicago, Ill., 1945)

"Every drop of water that runs to the sea without rendering a commercial return is a public waste."—Herbert Hoover.

This publication is a part of a long-time program of soil and water conservation being conducted by the Burlington Railroad in cooperation with other interested agencies. Valuable information has come from various sources, to which we have made reference herein. For their cooperation, we extend our sincere appreciation.

The reference numerals in parenthesis through the story are explained on the inside back cover of this booklet.

AMERICA'S FIRST MODERN-DAY IRRIGATION

When Brigham Young led his wagon train into the barren valley of the Great Salt Lake nearly 100 years ago, there were few who believed he could survive there. Although the soil was fertile and seasons favorable, shortage of rainfall seemed to preclude any hope of stable agriculture. Even before excavations for

a temple could be completed it was necessary to soften the dry earth with water, and so it has been said that the first modern-day irrigation in America was to produce a house of worship.

With a perseverance rooted in necessity and a vision grounded on the hardship of providing its own food en route while moving through arid, hostile, uncivilized regions, this little colony determined to base its entire economy upon irrigation. How well it has succeeded is attested by the prosperous farms and thriving cities in that great State today. To early-day Utah, irrigation was life itself. Food, clothing, shelter and trade relied upon it, and in a large measure still do. For Utah irrigation has made the desert bloom and factories hum and populations prosper just as it later did in a dozen other Western States—and just as it will continue to make deserts bloom and industry thrive and markets expand as irrigation is enlarged and improved throughout the semiarid West.

It requires only a visit to the irrigated West to convince the skeptic that here is population and industry and national strength at its best. Irrigation is truly a great national asset. From it flows the necessities of war and the luxuries of peace in a constantly swelling volume that attests the wisdom of Herbert Hoover's observation that, "Every drop of water that runs to the sea without rendering a commercial return is a public waste."

Irrigation an economic factor

Irrigation is an important producer and consumer of goods and services. Primarily, irrigation increases yields and prevents the loss of crops by drouth. This, in turn, improves and stabilizes farm production and income, provides new opportunities for more people on farms and in towns of the immediate area, bolsters the economy of surrounding dry-land areas, and increases taxable wealth of the community and Nation.

The new wealth created by irrigation through the channels of stabilized production, increased population and expanded property values, represents new purchasing power and enlarged consuming markets for industrial products. When the country as a whole gets a true perspective of irrigation in the national economy, particularly its importance as an outlet for manufactured goods, there should be a fuller appreciation of the development already accomplished and a demand for great utilization of the Nation's water and soil resources. To help provide this perspective, and to support it with authoritative data, factual examples of the results of irrigation in many parts of America, follow.

High returns to irrigators

Bureau of Reclamation records (1) show that average gross returns per acre on irrigated farms under its projects are more than two and one-half times that received by farmers the country over. This average is $36.33 per acre, compared to a national average of $14.41 for all field and fruit crops during the period 1931 to 1939 (2).

Compared with western dry-land production, the advantage of irrigated farming is still greater. In Yellowstone County, Mont., over three-fourths of the total value of crops were produced on irrigated lands which comprise only 23.4 percent of all land in farms (3).

In Scotts Bluff County, Nebr., the ratio probably would be about the same considering that, with only 43 percent of it irrigated, the agricultural production in 1940 was nearly six times that of 1910 when irrigation was just getting a start in that section. During this period the increase in dry-farm production has been relatively small. The 1940 value of farm crops in this county is more than double that of the next ranking county of the State, although the latter is slightly larger in farm area and much more favorably located as regards rainfall (4).

In the Big Horn Basin of Wyoming (Big Horn, Park and Washakie Counties), agricultural production has almost quadrupled since 1910, as a result of irrigation development (5).

Investigation will show that these records are repeated wherever irrigation farming is practiced. The larger returns from irrigated land are due not only to increased yields, but also to more valuable crops, such as sugar beets, alfalfa, seeds, vegetables, fruits, and specialty crops of a wide variety, which can be produced under controlled moisture conditions.

Population follows irrigation

Not only is irrigated land more productive and lucrative, but on a similar area it supports over three times as many farm homes as arid lands (4). In Yellowstone County, Mont., the disparity is even greater, dry-land farms are

more than five times as large as irrigated farms, and farm population per square mile of nonirrigated land averages only 2.74 persons, compared to 15.28 persons in irrigated portions of the county (3).

Irrigation, in addition to attracting new farmers, is responsible for the steady and permanent gains in population. In Scotts Bluff County, Nebr., population quadrupled (405 percent) between 1910 and 1940, although the State as a whole gained only 10.4 percent during that period (4). It is responsible too for the first population gain since 1900 in the central Nebraska (tri-county) project area (5).

It is reported that 200,000 persons left the Missouri River Basin during the decade 1930–40 on account of drouth (6). Supplemental water for crops could have prevented much of this migration and reduced the State and Federal relief expenditures.

A report by the War Food Administration (11) for 1940–43, shows that 735,904 additional inhabitants, or 9.7 percent left the Missouri River Basin. This loss in population was incurred despite substantial gains at several cities in which war industries were located. While this shift may be in part temporary, it appears unlikely that any substantial portion of these people will return unless a greater stability of agricultural and industrial production, through irrigation, can be assured.

Water brings community growth

The even tenor of production on irrigated lands exerts a stabilizing influence on a vast surrounding area, as well as on the immediate locality. Each irrigated acre is capable of supplementing 3 to 4 acres of nearby range land by providing assured feed supplies for livestock and preventing forced reduction of herds in unfavorable seasons (2).

In making a home on irrigated land, each settler creates the need for at least another family in the trading cycle and still another in the industrial centers (7).

Putting this into cash figures, J. C. Page, Commissioner of Reclamation, in his leaflet of general information concerning the Colorado-Big Thompson project, June 1941, shows that for every dollar spent for irrigation development, a business increase amounting to about $30 is created. This increase represents that of businesses and trades of all kinds.

Standards of social and civic services improved

Commercial benefits are not the only results of irrigation. Equally important is the fact that in irrigated sections the community and county receive adequate income to maintain good schools, roads, medical services, churches, civic improvements and public utilities—the many comforts and conveniences that typify the American standard of living—which cannot be satisfactorily maintained by scattered populations of uncertain income.

Property values increased by irrigation

Irrigation has transformed the western desert into an empire valued at millions of dollars (4). In most Western States the assesed valuation of irrigated lands is 10 to 15 times that of adjoining lands (2). The principal reasons for the higher values of irrigated lands are, the assurance of consistent production and the opportunity to raise crops of high market value, such as alfalfa, sugar beets, fruits, vegetables, etc.

The Colorado State College of Agriculture and Mechanic Arts has stated that irrigation has created property values amounting to more than 60 million dollars in northern and northeastern Colorado. Before irrigation, most of the land was in sagebrush and worth $1 to $5 and acre. Improved and irrigated it is worth about $125 an acre, based on average values over a period of 30 years (10). Where specialty crops are produced, values run as high as $300 an acre (2).

Irrigation a good governmental investment

On a dollars-and-cents basis, irrigation has proved a good investment for our Government. On Federal reclamation projects the annual taxes collected amount to approximately 5 percent of the entire construction cost (8). This does not include the large amount of indirect taxes flowing into the Federal Treasury from these irrigated areas, which together are computed at $400 for each person living on the projects, on farms and in cities and towns which the farms have created (9).

Irrigation farmers are large purchasers

When the farmer has money to spend he is a potential customer for a wide range of industrial goods. The irrigation farmer, with 2½ times the gross income of the average farmer, is therefore a potentially larger consumer of factory output. Long-time records show that only about one-fourth of the irrigation farmer's income is used for operation, taxes, labor and local supplies, while three-fourths of it goes into the general industrial and trade stream.

This means that $1,000 to $1,500 is put into the channels of commerce each year by the irrigation farmer (7). Multiply these figures by 430,000 (the number of irrigated farms in the United States) and the volume of trade thus created exceeds one-half billion dollars a year.

New markets in the West

In the Big Horn Basin of Wyoming irrigation has brought a 20-fold increase in products for export since 1910. Railroad records (13) at Basin, Greybull, Lovell, Powell, and Worland for that year show only 523 carloads of produce shipped from these stations. By 1941 their exportable surpluses amounted to 11,793 carloads of livestock, alfalfa, food and other products.

As consuming markets for goods produced in other parts of the country, the capacity of the region tributary to these stations grew from 653 carloads, received in 1910, to 5,161 carloads received in 1941, supplies being drawn from 18 States in 1910 and from 34 States in 1941.

Good customers in the North Platte Valley

Remarkable growth of consumer markets in the North Platte Valley of Nebraska is largely the result of irrigation. Sugar factories, creameries, packing, canning and other food and feed processing plants, as well as livestock feeding coincident with the rise of the sugar-beet industry, have put money into the pockets of farmers and townspeople alike.

In 1900, before irrigation began, Burlington Railroad station reports (13) show only 190 carloads, mostly livestock and hay, shipped out of Scottsbluff station. By 1910, as irrigation got under way, the forwardings totaled 1,306 carloads; in 1940 they were 2,404 carloads, and in 1942 they rose to 3,194 carloads.

A review of the record of imports made by the residents of this region discloses 283 carloads of goods from 6 States in 1900; 1,448 carloads from 14 States in 1910 (thanks to the impetus of first irrigation); 6,207 carloads from 37 States in 1940, and 7,144 carloads from 39 States in 1942.

The 1942 increase over 1940 is due principally to agricultural items. Other irrigated areas, such as Morgan, Larimer, Weld and other Colorado, Nebraska and Wyoming counties, show similarly impressive increases.

Irrigation improves commerce

Dr. H. C. Filley and Frank Miller, rural economists at the University of Nebraska, found some interesting comparisons in the commerce of Scotts Bluff County and that of eight counties in central Nebraska, namely, Adams, Buffalo, Dawson, Gosper, Hall, Kearney, Lincoln and Phelps (15).

The study, Economic Benefits of Irrigation From the Kingsley Reservoir, made prior to irrigation of the central Nebraska counties, shows that over a 10-year period (1926–35) freight *shipped* from Scotts Bluff County averaged 10,752 carloads per year, or 30.8 percent as many as the 34,910 carloads shipped out of the 8 central Nebraska counties annually.

Freight received in Scotts Bluff County during the same 10-year period averaged 20,020 carloads a year, or two-thirds as many as the 29,786 carloads received annually in the 8 central Nebraska counties. The ratio is particularly impressive considering that Scotts Bluff County's area (464,640 acres) is only one-tenth of that of the 8 counties (4,534,400 acres).

Per acre consumption in Scotts Bluff County is more than treble that of the central Nebraska counties, although only 43 percent of its area is irrigated.

New water; new wealth

In the States west of a line drawn from the Canadian border, along the eastern edge of North Dakota, thence south through Wichita, Kans., and Fort Worth, Tex., lie more than 740,000,000 acres (more than one-third of the land area of continental United States), which receive, on the average, less than 20 inches of rainfall a year. Irrigation and soil conservation could do much to stabilize production on such lands (16). Water, now unused, in these States could be conserved to give an assured supply to the present irrigated lands and to reclaiming a vast new area.

Supplemental water for areas already developed, together with soil-conservation practices, would bring a larger measure of security and increased productivity to 11,000,000 acres in 123,000 farms. Enough additional water and suitable land is available to create approximately 383,000 more irrigated farms. On these new farms, and in the towns which would grow up among them, nearly 6,000,000 persons could make their homes. These developments would create property values in excess of $16,000,000,000. Our total ultimate irrigated area would approximate 43 million acres occupied by 703,000 farm homes (17).

In the Missouri River Basin alone 5,000,000 acres could be irrigated with water from the Missouri River and its tributaries. This development would mean homes for 50,000 farm families and a half million more people engaged in the trades and services that would naturally follow.

Opportunities in the west

There are a number of Midwest States in which irrigation water is now available and will continue to be available if not devoted to other less useful purposes. Large areas of good fertile irrigable soils are available in reasonable reach of this water. Prominent among these are—

	Irrigable acres
Montana, with	1,313,930
Wyoming, with	448,960
Colorado, with	102,999
North Dakota, with	1,266,440
South Dakota, with	972,510
Nebraska, with	1,009,375
Kansas, with	193,490
Total	5,307,704

In this vast central western region lies one of America's great postwar opportunities for new farmers, industrial expansion and new markets for products from the industrial East. Here is a veritable modern frontier awaiting wise exploitation, a new living room for the potential postwar unemployed.

Irrigation supplements Corn Belt production

Crops produced upon western irrigation projects are supplemental to rather than competitive with crops produced upon agricultural lands of other sections. The principal products of western irrigated lands are alfalfa, sugar beets, seeds, wool, and fruits, many of which are in demand in the Central and Eastern States. Most of the forage and grain crops, considered national surplus crops, are consumed locally in the livestock industry of the irrigated West in greater quantity than produced.

A study of the 11 Western States which constitute the original reclamation area shows that, over and above what is produced locally for home consumption, there are purchased from other sections of the country annually—

$120,000,000 of corn, hog, and pork products;
$97,000,000 of cotton, cottonseed, and textiles;
$90,000,000 of tobacco and tobacco products;
$15,000,000 of hard wheat flour and processed cereals;

and large amounts of other commodities.

Production in continental United States of sugar and wool, two of the major products of Federal irrigation projects, approximate only 50 percent of our total requirements. Less than one-tenth of 1 percent of the Nation's corn, and six-tenths of 1 percent of the wheat are grown on these projects. The portion of other national surplus crops such as cotton and tobacco produced under irrigation is also relatively small. Irrigation, to be economical, must be devoted in the main to crops responding to intensive cultivation, such as sugar beets, fresh vegetables, canning crops, alfalfa and animal products, most of which are not normally surplus. Irrigated areas are consumers rather than producers of national surplus crops.

Irrigation important to all

In our postwar planning it seems obvious that we should not neglect the development of any of our natural agricultural resources. If we are to make a smooth, shock-proof shift to peacetime economy and provide employment and farm and business opportunities for persons returned from military service, these new developments are vital. For the present, when production of foods and feeds are matters of military concern, as well as for the future, irrigation and soil

conservation in every suitable area are matters of Nation-wide interest. The benefits of such development contribute to the economic and social welfare not only of irrigated areas and the counties and States in which they lie but of the entire United States. Irrigation is a national asset.

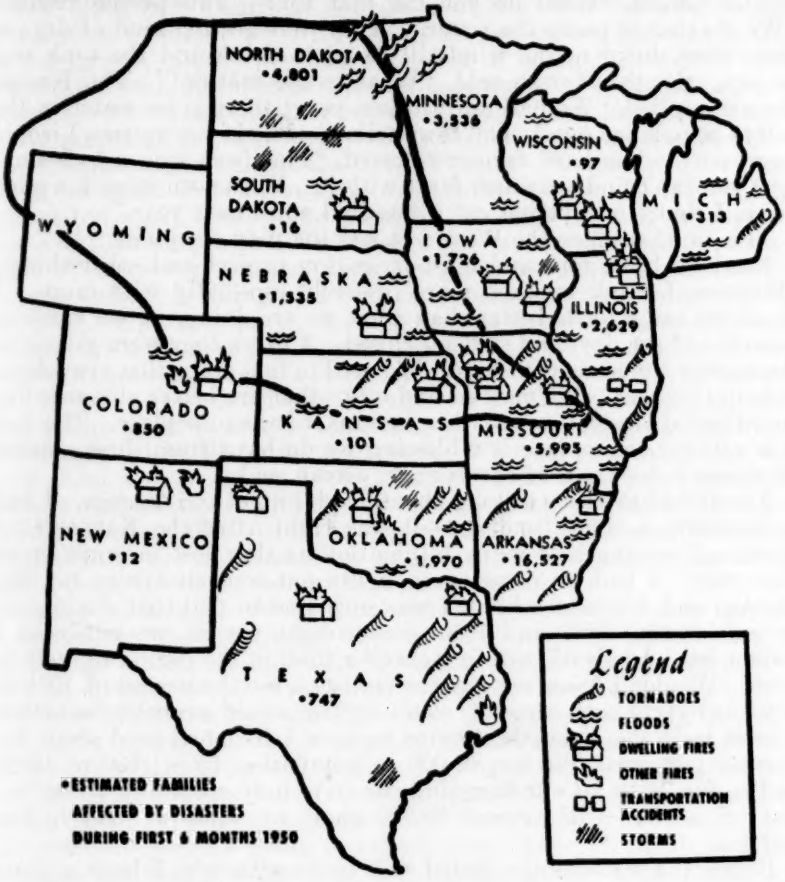
REFERENCES

The following are explanations of the references (numerals in parentheses) through the story:

No.

1. United States Reclamation Service records, required for all projects in connection with repayment terms, are quoted here because of detailed information contained in them. They are on file at Mitchell, Nebr., and are available for public inspection.
2. "Reclamation Offers Solution for Migrant Farmer Problems in the West," by J. C. Page, Commissioner of Reclamation, in the Reclamation Era, November 1940, page 307.
3. "Some Economic and Social Aspects of Irrigation in Montana," by P. L. Slagsvold, J. D. Mathews, department of agricultural economics, Montana State College Bulletin 354, January 1938, pages 9–10.
4. United States Census: 1910, 1940.
5. G. E. Johnson, general manager and chief engineer, central Nebraska public power and irrigation district, Hastings, Nebr., at irrigation meeting, Paxton Hotel, Omaha, Nebr., January 6, 1944.
6. "Reclamation Possibilities in the Missouri Basin," by S. O. Harper, chief engineer, Bureau of Reclamation, before National Reclamation Association, Denver, Colo., October 29, 1943, page 3.
7. "Nation Benefited by Irrigiation," by L. H. Mitchell, reclamation economist, in the Reclamation Era, February 1935, page 36.
8. "Reclamation as a Federal Investment," by F. D. Helm, treasurer, Uncompahgre Valley Water Users' Association, Montrose, Colo., in the Reclamation Era, March 1935, page 63.
9. "Reclamation Fulfills Its Mission," by J. C. Page, Commissioner of Reclamation, in the Reclamation Era, July 1938, page 126.
10. Alvin Kezer, agronomist, and R. T. Burdick, economist, Colorado State College of Agriculture and Mechanic Arts, letter to author, July 3, 1944; R. L. Parshall, senior Federal irrigation engineer, Colorado State College Experiment Station release, March 10, 1938.
11. "Relation of Western Reclamation to National Progress," by Senator Carl Hayden, Arizona, in the Reclamation Era, March 1938, pages 41–42.
12. "Spread of the Work at Boulder Dam," by W. E. Warne, Assistant Commissioner of Reclamation, in the Reclamation Era, July 1935, page 133.
13. Burlington Railroad station reports, made monthly, show freight moving in carload lots only, and represent about 25 percent of total volume of trade. Less-than-carload shipments, other transportation facilities, and restriction or elimination of much civilian goods during the war must be considered for complete record.
14. "Information about Morgan County, Colorado," page 126, prepared by county extension office, sponsored by Fort Morgan Chamber of Commerce and Brush Civic Club.
15. "Economic Benefits of Irrigation From the Kingsley Reservoir," by H. C. Filley, Frank Miller, rural economists, University of Nebraska Bulletin 311, pages 54–55.
16. "Why Irrigation?" by W. E. Warne, Assistant Commissioner of Reclamation, in the Reclamation Era, April 1939, page 74.
17. "Stabilization by Irrigation," by E. B. Debler, hydraulic engineer, United States Reclamation Service, in the Reclamation Era, November 1940, page 311.
18. Based on Department of Agriculture crop reports, quoted by J. M. Dille, secretary-manager, Northern Colorado Water Conservancy District, Greeley, in letter to author dated July 5, 1944.

40,000 Families Affected By Disasters in 16 States, 6-Month Survey Shows—Floods, Tornadoes Cause Greatest Loss



Mr. KUSKA. I think we have done a pretty good job in the Missouri Basin. I might say in the Central West or the Great Plains area during the years gone by, we have made a mistake by not having a lot of research, which has held us up.

I can remember the time when we thought dust mulch was the answer to our problem. But it does not fill the bill. We have had some good statements from Mr. Griffith and Embert Coles on what we need in the Missouri Basin, and that is some fundamental research. We then need to carry the results out to the people so they know what we have discovered.

My job used to be locating settlers along the railroad. We had some in northwest Kansas, where the families had came out from Iowa, homesteaded, and did very well for a year or so. Then of course, we had a dry spell and they "dried out." The folks back in Iowa wanted to visit, and they came out and wanted to look at the ranches. They looked at them, and the first thing they saw was the fall wheat was

brown and the milo was brown. They then looked at the pastures and they saw a windmill. These windmills were rather new to the Iowans, as they had very few of them back home. They asked this one particular person, "What do you use that for?' This person replied, "We use that to pump the water." They were getting kind of dry; so they went down to the windmill to get a drink and the tank was empty. So, this Iowan said, "What is the matter?" The Kansas farmer replied, "We had no rain last year; there is no water in the soil to be pumped out." The Iowa fellow said, "If I were you, I would move out." The local farmer retorted, "This isn't such a bad country; you can't find too much fault with it. With corn at such a good price, I figure on putting out a hundred acres next year."

This is what made the West. It was the pioneer spirit.

Now, we have gone and built irrigation project and other things. However, I think we need more research, especially with crops. I think we can still do better than what we are doing. I am sorry to see some of the dry-land stations closed. I think they were giving us the answer we needed out here. We need to find crops that are adaptable to this area. We need to find crops that are better able to withstand hail damage, because when it rains it hails someplace. The fact it is raining some place is a blessing we do have from these storms. If we can reduce half of our damage, we can get by.

You folks have been talking about flood control and damage. I had an occasion a short time ago—it was right after the Kansas City flood—of hearing how many billion dollars they lost in crops down that way. I had an occasion to figure out some statistics for Nebraska; and, low and behold, I was surprised to find that during the period between 1930 and 1940, the drought period, we produced 1 billion less bushels of corn in Nebraska than in the period of 1920 to 1930. We don't know exactly the statistics for the period of 1940 to 1950, as hybrid corn came in; so the figures would probably be better. I have used the Nebraska figures because I had prepared them for another purpose. We lost 62,000 in population from 1930 to 1940; and so far, with all our bragging, we have only recovered about 10,000. So, we're still around 50,000 short of what we had in the thirties.

Beside the statement, which I will leave with you, I have a chart which shows the relationship between irrigation and dry-land farming. This was prepared by the Bureau of Agriculture, which I believe brings out some of the problems we have with irrigation. Then, I have a paper which deals with the North Platte project, which shows what has happened there over the last 25 years; that deals with the different types of farming we have gone into.

We have had some Government programs that have discouraged some of the practices on the soil that we knew before, by building up the fertility of the soil. We had some erosion before the farm program came into effect. I am not talking about summer fallowing either, but am talking about getting some of the sandy ground into cultivation. I believe that is all I have.

Mr. HOPE. Are there any questions? Thank you Mr. Kuska.

Our next witness is Mr. Harry Bird, chairman of the Walnut Creek Watershed Flood-Control Association, Albert, Kans. Mr. Bird.

STATEMENT OF HARRY BIRD, WALNUT CREEK WATERSHED FLOOD-CONTROL ASSOCIATION

Mr. BIRD. Mr. Chairman, members of the committee, ladies and gentlemen, I am here in the interest of the association that was formed at La Crosse, Kans. We had about six or seven floods on Walnut Creek this year, and several times some of the members of our association were forced to leave their homes, and some have never moved back.

At our recent meeting, we had the Soil Conservation boys, the PMA, the Extension Service, and the Farm Bureau. We met in order to see what we could do in preventing these floods, floods which have happened too many times to be pleasant. At this meeting we stressed some of the things which Mr. Praeger has so ably talked about today: that of terracing, contour farming, planting grass on the steeper slopes, and the building of detention dams, ponds, and things of that nature. And the thing we came up against was the fact that the soil-conservation program, along with the PMA, did not offer the facility or the whereas to build the retention dams which we think are needed in this area to prevent floods. We have a number of ponds and small dams, but what we need is something in between those and the dams recommended by the Army engineers. We need something that will cost from a thousand to 8,000 dollars. These dams are beyond the means of the farmers, and that is the reason why we think we should have money available and the wherewithal to build small detention dams, which are in between the larger dams and the many ponds and small detention dams we now have on the farms.

After we had our floods this summer, we wanted to see for ourselves about what the floods cost the farmers in the valley. So, we in Barton County, called in the Township Committee, the PMA boys. We sat down at tables in the vicinity where we knew all the neighbors. We asked each one how much he lost. Then, we added up the losses of the farmers in Barton County, the West Walnut, and the Arkansas River area. The estimated total was around $800,000 loss in the floods we had from the first day of June until the first day of August. I am speaking of revenue and taxation. We know now that the Internal Revenue boys aren't going to collect much money from those areas; at least not nearly as much as they would if these floods could have been prevented.

While I do not think we can make it pay its way, I do think we should have money set aside to build the detention dams we were speaking about. We are thinking of not only ourselves, but our children, and their children, who will be farming our land after we are gone. They are entitled to make a living off the soil, as well as we farmers are today. And, I personally think that farmer who can turn his farm over to his children in as good condition as it was when he began farming, will have achieved success.

I think that is all.

(The following statement was submitted by Mr. Bird:)

To Agricultural Subcommittee on Flood Control:

We, of the Walnut Creeks Association, feel that permanent flood control will result from the use of complete conservation measures, as the permanent practices of sod waterways, grass seedings, terraces, contour farming, etc., where the water falls or at the head of the watersheds.

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Following these protective measures, the use of detention storage structures where deemed advisable for further control on the small watersheds and their tributaries.

A survey made in August 1951 in Barton County by the township committeemen of Production Marketing Administration and Soil Conservation Service listed the crop loss estimated at around $800,000. Barton County is the mouth of the Walnut Creeks watershed.

HARRY BIRD,
Chairman, Walnut Creeks Watershed Flood Control Association,
Barton County, Kans.

Mr. HOPE. These floods on the Walnut Creek not only did a lot of damage to the farms in the valley, but they also did a lot of damage in Great Bend; isn't that right?

Mr. BIRD. Yes. However, we had no way of getting an estimate of the loss at Great Bend.

Mr. HOPE. So, that estimate does not include Great Bend?

Mr. BIRD. No, this is just crop and farm loss. We have grassland which is covered from 1 to 5 inches of silt. The grass is dead.

Mr. HOPE. So, if we put in the dams and soil treatment you are talking about, you would not have the damage that has occurred in the valley due to the floods?

Mr. BIRD. That is right. We have had about 12 floods in the last 2 years.

The CHAIRMAN. You could save the damage that has occurred in the city of Great Bend when you have one of those floods, and you would also prevent a certain amount of the water from going down the Arkansas River that causes floods down below. So, whatever is done to take care of your local problem, and I say local problem because it is a local problem compared with the floods down on the larger streams, would not only benefit you but it would be beneficial in preventing larger floods below when the streams are down around the Great Bend area. The only protection that can be afforded your people in the valleys is to have some work right there in that particular area. You will agree, I am sure, that what Mr. Praeger said and others said would not only take care of your situation but would contribute to the flood control down the streams.

Mr. BIRD. I might say that there are seven or eight projects that have already been turned into Congress for action in different places in Kansas. And, we would like to see this made one of them. You have to have an example for the community to get the people to see it.

Mr. HOPE. You understand there isn't very much money appropriated for these projects all over the country. I believe there are only 11 projects in the country as of today and very little money is being spent. I think the last Department of Agriculture bill was 6 or 7 million dollars for all 11 projects. So, you can see that very little has been done. Of course that is the purpose of the committee in going out to hold these hearings; to develop information that will be helpful to us in bringing about more support for projects of that type. We appreciate your contribution.

Mr. BIRD. We had a lot of damage on up above. I just gave the loss for Barton County. We had damage in Rush and Ness Counties, and maybe up as far as Dighton in Lane County. And, all the boys were represented at that meeting.

The CHAIRMAN. I am afraid that your statement indicates that you got a wrong understanding of what I was trying to say a while ago. I don't want to be misunderstood. I don't have any objection to these

projects because they must be paid for out of tax money. In fact, many of them can be shown to be highly justifiable and are very good investments. The point I want to make clear is not that we should condemn them because it takes tax money to pay for them, but we should realize it does take tax money. Never kid ourselves into thinking that you can take a project the size of your Walnut Creek and make the farmers in that area pay back to the Government the cost. You place a burden which they should not bear and cannot bear. The Walnut Creek project doesn't only benefit the farmers along Walnut Creek, as it certainly benefits the people in Great Bend as well. It certainly contributes proportionally to the protection of the people all the way down through Oklahoma, Arkansas, and Mississippi.

As I see it, it can be thoroughly justified, even though it will take tax money to pay for it. However, if we assume and tell each other and ourselves that these things can be done without adding to the tax burden, we are just fooling ourselves and making it more difficult to carry out a successful program, because somewheres down the line the people of America will have to pay the bill. And unless they understand why they are paying the bill, they won't pay it, and unless the taxpayer is willing to pay the bill, the Congress won't appropriate the money.

So, let us not kid ourselves and say this will all be paid for by the Government, or by irrigation water or by people buying power. Let us tell the truth. Tell them that somebody has to pay for the flood control. The people deriving benefits from irrigation will pay for that portion of the dam that is kept full of water. However, that doesn't protect anybody from the floods. And the people that buy power will pay the Government for that portion of the dam kept full of water to produce electricity. So, somebody has to pay for the portion of the dam which is kept empty, and that has to be the taxpayers.

I just wanted to have it perfectly clear that somebody has to pay for it, and I was afraid you thought I said it shouldn't be done because the taxpayer would have to pay for it.

Mr. BIRD. No; I didn't misunderstand you.

Mr. HOPE. Are there any more questions? Thank you very much Mr. Bird.

Our next witness is Mr. W. H. Sunderland, Kansas State Board of Agricuulture, Topeka, Kans. You may proceed Mr. Sunderland.

STATEMENT OF W. H. SUNDERLAND, KANSAS STATE BOARD OF AGRICULTURE

Mr. SUNDERLAND. Mr. Chairman, members of the committee, ladies and gentlemen, I am here largely as an observer today. However, I do have a prepared statement which I would like to leave with you. Other than that, I don't have any comment to make.

(The statement referred to above is as follows:)

STATEMENT OF W. H. SUNDERLAND, SENIOR ENGINEER, DIVISION OF WATER RESOURCES, KANSAS STATE BOARD OF AGRICULTURE

The Missouri River Basin agricultural program recommended by the Secretary of Agriculture has been carefully reviewed in the office of the Kansas State Board of Agriculture. It is believed that the proposed program would bring substantial benefits to the Kansas portion of the Missouri River Basin. The Kansas State Board of Agriculture would cooperate in every way possible in

development of the program. We urge that the proposed program be authorized by Congress and that funds be made available for putting it into effect.

Conservation and improvement measures for grassland and cropland which have been carried on in the past are of particular interest to Kansas because of the relatively large proportion of the State devoted to grazing and crop production. Acceleration of that work would be highly desirable.

There is also a great deal of interest in that part of the proposed program dealing with stabilizing measures for small watercourses. That constitutes a substantial part of the program and is considered as being of the utmost importance. Such construction, little of which has been undertaken in Kansas, would provide substantial flood-control benefits along the small water courses and in the upper reaches of the larger watersheds.

Most of the counties in Kansas have been organized as soil-conservation districts which, in cooperation with the Soil Conservation Service, provide technical assistance for landowners in the development and construction of drainage and irrigation projects, farm ponds and detention reservoirs, terraces, and other such improvements. The districts would be in position to cooperate in putting the proposed program into effect as funds are made available.

Mr. HOPE. Thank you, Mr. Sunderland. We are glad to have your statement. Are there any questions? Thank you again, Mr. Sunderland.

Mr. Jeff Huff, representing the Jennings, Kans., Chamber of Commerce, will be the next witness. Mr. Huff.

STATEMENT OF JEFF HUFF, JENNINGS CHAMBER OF COMMERCE

Mr. HUFF. Mr. Chairman, members of the committee, ladies, and gentlemen, I haven't much to say but I want to be sure you gentlemen won't go back to Washington with the idea that the farmer in western Kansas isn't doing his part.

I represent the Jennings Chamber of Commerce. We in Decatur County have made tremendous strides in terracing. I believe all the money which has been used by the farmers in Decatur County has depleted the funds available. So, we are doing our part. We haven't a prepared statement at this time, but will mail you one later.

Mr. HOPE. We will be glad to have you do that, Mr. Huff, and we thank you for your talk.

Mr. Clayton Diehl, of Oberlin, Kans., is our next witness. Mr. Diehl.

STATEMENT OF CLAYTON DIEHL, OBERLIN, KANS.

Mr. DIEHL. Mr. Chairman, members of the committee, and anybody else that wants to listen to me for a minute, I am not going to take much of your time. It seems as though this is running into a "me too" discussion.

I am an old buck that has lived up on the creek about 56 years. A lot of water has gone down the creek and a lot more will. One of the main troubles is that we have the cart a little ahead of the horse. This Pick-Sloan plan was started a little while ago and us farmers weren't thinking of terraces. We should slow it up a little.

Now, I am happy to be living where one of these Pick-Sloan dams is on my property. So, I am interested. However, I would like to ask you gentlemen in all sincerity, why the hell we bring water clear from Goodland to Oberlin before we try to stop it, drifting all that soil along the way when they need it where it fell at Goodland? Why don't you steal a little money from the Pick-Sloan projects and start

the program that Congressman Hope has so ably portrayed? Let us at least try it. It will take a little while. Goodness knows we can't have dams all over the country. Anybody knows that. We couldn't pay for all them. Santa Claus doesn't come often enough. It just seems to me we should try retaining the water where God intended it to be, not bringing it down here and building a big dam.

Why, I heard a Pick-Sloan engineer at Topeka say: "I don't want to put my name on any of these little dams. I want to put my name on the big ones."

There is a lot of those fellows. Unfortunately, we have to have engineers to build the little dams, too. I don't want you to throw up a little earthwork. We saw a lot of those that we built washed out. There should be some supervision of them, especially if we are going to put money into them. There ought to be strings to them. These boys can take care of that [nods toward committee].

Let us try to retain the soil and the moisture as near to the place where it falls as we can. It is like what Mr. Cole said, that the greatest dam in the whole world is the soil, the sponge that sponges the water up as it goes into the soil, so that it will never bother Kansas City nor Topeka. Of course, they want some dams to wash out their sewage and they need to do so. [Laughter.] They do need some water in order to wash out their sewage, but I'll be blamed that I want to ruin a lot of the best land in western Kansas, just so they can wash out their sewage. [Laughter.]

I do believe you should build the little dams and fix them so you have an overflow and a place to store water for flood control. After that is done, you will probably need some larger dams, but gentlemen, let us not get the cart before the horse. [Applause.]

Mr. HOPE. Are there any questions?

Thank you Mr. Diehl.

Our next witness is Mr. Guy Bemis, a farmer from Oberlin, Kans. Mr. Bemis.

STATEMENT OF GUY BEMIS, OBERLIN, KANS.

Mr. BEMIS. Mr. Chairman, Congressman, and others, I just have a few words to say today. I am sorry to take up your time for a personal question.

I live on a farm located southwest of Oberlin, Kans., and below me there is a proposed Pick-Sloan dam. I have attempted to find out how much area will be covered if this proposed dam is constructed. How much area would be covered, how much land would be purchased, and all the details. And, I feel sure there must be many farmers in Kansas in the same position.

So far, I have been unable to secure this information that I desire. I know that it depends on the appropriations from Congress as to when the dam will actually be built, but in the meantime, there are a lot of farmers who would like to know the details. So, my question is, Where can we find this information?

The CHAIRMAN. Apparently this publication which I have before me will give you that information. It is published by the Bureau of Reclamation, dated August 1951, and gives the following information: The height of the dam is 73 feet, the storage capacity is 43,280 feet, it will cost $6 million, the miles of shore line at 17, and the completion

date is set for the spring of 1956. I believe that is all the information that it gives. However, I am sure you can get additional information from the Army engineers if their report has been made, and I am assuming the report has been made.

Mr. HOPE. It certainly must be a Bureau of Reclamation dam.

Mr. BEMIS. I feel it must be.

Mr. SMITH. I can't tell that. I have tried to find out from the Bureau of Reclamation, and they tell me their plans do not show the exact water line.

Mr. BEMIS. Now, you say the information which you have given me, calls for completion by 1956?

The CHAIRMAN. Yes, but of course that depends on the appropriations.

Mr. BEMIS. When would the funds have to be appropriated if the dam is to be completed by 1956?

The CHAIRMAN. I think we can safely say that since there were no new projects appropriated for this year that it may be a little later than 1956.

Mr. HOPE. I believe Congress appropriated funds for only one reclamation dam in Kansas this year, that was the Kirwin Dam.

The CHAIRMAN. Basically, there were no new appropriations this year so that sets the program back a year or so. The fact there were no appropriations will no doubt set all the projects back at least 1 year.

Mr. BEMIS. It is still not clear to me. You say there were no new appropriations made this year?

The CHAIRMAN. Not for new projects. The Kirwin project was the only one in Kansas for which appropriations were voted. The policy over the Nation as a whole was not to start any new dams but to appropriate money to carry on those already on the way. You also must remember that the appropriation bill passed the House before the Kansas floods.

Mr. HOPE. Let me suggest that you keep in touch with your Congressman Smith about the matter. I am sure he will give you the information that is available.

Mr. BEMIS. Thank you.

Mr. HOPE. Our last witness is Mr. Don Christy, who has already spoken for the Scott City Chamber of Commerce. However, this time, he is representing the Kansas Association of Soil Conservation District Supervisors. Mr. Christy, it is a pleasure to have you with us again.

STATEMENT OF DONALD CHRISTY, KANSAS ASSOCIATION OF SOIL CONSERVATION DISTRICT SUPERVISORS

Mr. CHRISTY. The directors of the Kansas Association of Soil Conservation District Supervisors asked me to appear for them.

The soil-conservation districts of Kansas have been a little slow in starting originally, but in the past 6 years we have increased from 30 to 104. I don't know for sure the last figure, but it covers practically the whole State.

We endorse the general plan of the agricultural program of the Missouri Basin. In other words, "me too." [Laughter.] We would like to see a few projects demonstrating the program, a few typical projects demonstrating the actual effectiveness of such program. And we

would like to see soil and water conservation as part of any program involving the larger drainage, or rather storage, projects, feeling that the dam sites available are too valuable to waste without giving them all possible protection.

Now, unless there are other questions, I believe that is all.

The CHAIRMAN. I would like to have your idea as to whether it is more practical to try to undertake an authorization for the area the size of the Missouri Valley, or try to start out with the small projects—selected projects.

Mr. CHRISTY. Congressman Poage, that would probably be more easily answered by you folks. No doubt it might be. I have leaned toward the idea that maybe we can get more done on a number of small dams and thus sell the over-all program, not just the Missouri Basin—that is only one part of the United States—but the entire water problem of the United States.

Now, the Waco project was started a number of years ago for studies on flood control, the effect of conservation on flood control, and we studied these reports rather thoroughly for a number of years, but I have seen no more of these reports in recent years and am a little bit inclined to think they are not doing too much.

The CHAIRMAN. You are talking about the creek near Waco?

Mr. CHRISTY. Yes.

The CHAIRMAN. It has been closed down.

Mr. CHRISTY. I am also wondering about the Iowa and Oklahoma projects. Unless they produce something spectacular to sell the public, how many will continue long enough to tell us anything?

The CHAIRMAN. It would depend on how fast you can get the money.

Mr. CHRISTY. The floods in Kansas City and Topeka and Manhattan have done more toward advancing this whole flood-control program than anything else that has happened in a good many years. The dust storms in 1935, when they could see the dust over the Atlantic, got a lot of money appropriated for soil conservation in the first place. Spectacular happenings determine to a great extent when and how you get the money. And any project that will produce spectacular results will get money, and the projects which aren't so spectacular often die.

The CHAIRMAN. I think you are right on that.

Mr. CHRISTY. I have a feeling that the easiest selling job from the long-time standpoint, is a smaller project demonstrating what can be done. However, on the other hand, I also realize that deals like this which needs some big money behind it will get the money by a good advertising program which lets the people know what is going on. I'll admit this is a pretty big question.

Mr. HOPE. You would be in agreement, I take it, with the idea of getting enough money to go ahead with the Washita project and complete it within a reasonable time, because in that case you would have a demonstration of what can be done?

Mr. CHRISTY. Yes, by showing what can be done.

Mr. HOPE. Whereas, if you spread it out—the appropriations out over a hundred years which is the length of time it would take at the present rate, you wouldn't have much to show the public?

Mr. CHRISTY. It would die, one form or another, before it was ever completed. That is my personal opinion of what would happen. Now, how expensive and how big they should be, I don't know. But,

I do think we should have more demonstrations. Something in which they could show the people.

I first started to work for the soil conservation with the idea of getting terracing started and something done, and when we went back to Congress and said: "This is what we have done," we got the money, we got some help.

I also happened to have worked for another agency of the Government. We had a wonderful set of plans, but when we went back to Congress, we said: "Here are the plans." Did John Smith and Henry Doe, and so forth, know about that? No, they didn't. And we didn't get a red cent for the plans. In other words, you have got to have something the people can see to sell them. At least that is my personal opinion. And I think more scattered projects showing what can be done will do the job.

Mr. HOPE. Are there any more questions? Thank you, Mr. Christy.

Mr. J. T. Heinen, representing the Solomon Watershed Association, from Cawker City, Kans., is our next witness—Mr. Heinen.

STATEMENT OF J. T. HEINEN, REPRESENTING THE SOLOMON WATERSHED ASSOCIATION

Mr. HEINEN. Mr. Chairman, Members of Congress, ladies and gentlemen, I think about all the ground has been covered pretty well this afternoon and this morning, and if I said anything, I would just be repeating what has already been said.

Our people down on the main Solomon have organized the Solomon Watershed Association, which means soil conservation, farm ponds, terraces, and retention dams on the tributaries to the main rivers. We believe with the cooperation of the people that we can accomplish something to avert these devastating floods, at least as far as our extent of it would be considered. We have a project in our county—the Glenn Elder Dam. The estimate of it runs into many million dollars. Inasmuch as this estimate was made some time ago, you would have to add at least 30 percent more to cover the increase in costs. The sad part of it is that it takes about 18,000 acres of our most valuable bottom land out of production. That is the loss. If this dam is built for flood control, then I think we can overcome that loss by going at it in other ways. Like our soil conservation association proposes. More soil conservation, terraces, ponds on the farms, and retention dams on the tributaries.

We had a very nice example in Jewell County. I think Jewell County, in the way of soil conservation, is ahead of many other counties. We have in Jewell County, Ox Creek and little Ox Creek, which runs I think, some 20 miles before they reach the Solomon. They have practiced terracing, built ponds, and this year in spite of the heavy floods, Little Ox was never bank full. Big Ox didn't overflow. Years ago with less rainfall, Ox Creek has overflowed. This is the practical example which we think should be followed up as we see it.

I don't want to take up any further time, but I would like to leave the resolutions of our association with you.

Mr. HOPE. We will be glad to receive them. Are there any further questions? Thank you very much Mr. Heinen.

(The resolution referred to is as follows:)

RESOLUTION

CONSERVATION, FLOOD CONTROL, AND IRRIGATION

Whereas the active cooperation of the citizens of a democracy with its government is the basis of a vigorous national life; and

Whereas it is a recognized opinion among agricultural leaders of the State of Kansas that erosion of its soil is causing greater damage to its agricultural resources than irigation or main valley flood-control works can compensate, and

Whereas a sound flood control program must be developed as near the source of the flood as possible in order to effect the greatest possible reduction in flood damages: Therefore be it

Resolved, That this movement expand its activities and membership on a watershed basis for the purpose of cooperating with appropriate Government agencies, citizens' committees, professional technicians, and others, in the planning, development, construction, and operation and maintenance of a watershed program for conservation of soil and water resources and flood control and general agricultural and economic welfare of the area, such program to be designed on the folowing general lines:

1. Land practices for soil and water conservation and run-off reduction.
2. Retarding structures on upland waterways to reduce flooding.
3. Dry dams on tributary creeks to control floodwaters before they reach the valley land and to use land of least value for reservoir purposes.
4. Main-stem dams constructed on automatic discharge principle for flood control only, without any water use storage, for protection of localities of concentrated wealth, such as in large cities, provided suitable dam sites are available adjacent to the need, and provided further that due consideration has been given to the damage to cropland in the reservoir area.
5. Levees and dike protection for cities where useful.
6. Floodway zoning to encourage reconstruction of flood devastated improvements on high ground.
7. Consideration of irrigation needs of the area with due regard, among other items, to the relative value of crop production now grown in the proposed reservoir areas, that would be destroyed or damaged, and expected increases in crop production resulting from contemplated irrigation program, alternate irrigation methods, and to whether the money spent on irrigation projects might be better spent with greater returns on conservation or other projects; and be it further

Resolved, That the chairman be instructed to appoint a committee to draw up articles of incorporation, constitution, and bylaws, as needed, for a nonprofit organization, to be incorporated under the laws of the State of Kansas, to be known as the Solomon Watershed Association, to carry on the work of this meeting, such articles of incorporation, constitution, and bylaws to be presented to the general public for consideration at an early date.

Approved at public meeting October 3, 1951, at Cawker City, Kans.

Mr. HOPE. Mr. I. H. Hickman, representing the Solomon Valley Association, of Kirwin, Kans., is the next witness—Mr. Hickman.

STATEMENT OF I. H. HICKMAN, REPRESENTING SOLOMON VALLEY ASSOCIATION, KIRWAN, KANS.

Mr. HICKMAN. Mr. Chairman and members of the board, I live in Phillips County and represent the Solomon Valley Association, and also Phillips County as a whole.

I am deeply interested in the Kirwin Dam, because of the fact it is taking out of Phillips County what we considered to be one-fifth of its best land, and it is taxable property.

Mr. HOPE. Then, you are opposed to the Kirwin Dam?

Mr. HICKMAN. Absolutely opposed to it. It has been hashed over repeatedly this afternoon, my thoughts concerning soil conservation and small dams. It has been hashed over and over. And that is one reason why our Solomon Valley Association was formed.

We have been in operation for 10 years, preaching and lecturing on soil conservation and attempting to get help, and working along as best as we could. We have asked repeatedly to have a group like you men come out and look over the type of soil we have, the type of land we had. And we never had a hearing. Never saw anyone.

I had a letter last week from a Senator, in which he said that they had never had any activity, other than from the Reclamation people, the Department of Agriculture, and the Department of Interior. We have asked for a hearing and was promised a hearing at the next legislature. But on the last day at the last hour and the last minute, through a conference only, there was wrangled out by one man, appropriations for the Kirwin Dam. It was done in conference. I think you people will bear me out. This amounted to $2,500,000, a starting point for the Bureau of Reclamation. That amounts to $19,000, as I figure it quickly, for each section involved in the Kirwin drainage area of those who will benefit by it. You have only given the PMA boys in our county $36,000 to operate on. That is a pittance of which is required. Give them $19,000 more, and each county above here $19,000 more this year, and do that year after year until this huge amount of money is spent, and you will have accomplished far more than you will accomplish by spending this tremendous amount on the Kirwin Dam. If you spend $19,000 a section, you won't have any place to spend it in this area. There are many sections in the first 50 miles that you couldn't spend anything on, even if you tried. It is too level.

Mr. HOPE. You are opposed to the Kirwin Dam, which, as I understand it, is a reclamation dam, and is intended to irrigate some land below the dam. Now, what is your comment as to that?

Mr. HICKMAN. There is land that can be irrigated. The land below is the same as that above. One is equal to the other.

Mr. HOPE. In other words, they are going to take a large area out of cultivation and hope to increase the productivity of the other area below the dam; is that right?

Mr. HICKMAN. That is right. However, they are taking out more acres above than they are going to irrigate below. They are also going to raise the Kirwin Dam, which will naturally push the water back 2 miles farther.

Mr. HOPE. What about the farmers in the area? Are they anxious to have the irrigation?

Mr. HICKMAN. I am glad you asked me that question. When the irrigation people came into our county they went about it in a very systematic manner and painted a rosy picture of the vast crops and increase of production at a very nominal cost for water. We sent a man to Washington to gather information from the Reclamation Bureau, and the figures he obtained as to the cost of the water to them and the figures they gave to the farmers, were vastly different. And upon the information passed to the farmers, a number of them asked to have their names released, because of the fact it had been misrepresented to them. And they were not allowed to form a district. Then, the Bureau of Reclamation boys went into action and reduced the requirements as to the number of signatures of landowners in that district, so that they might form another district on an easier basis. They worked many weeks and months before they were able to obtain a sufficient number and then it was barely over the margin.

Since that time, there has been a sufficient number of additional people who have asked to have their names withdrawn.

We have a very fertile valley down there. We raise alfalfa, corn, and wheat, and all the feed crops, such as we require.

Mr. HOPE. Is there any irrigation going on in that area now?

Mr. HICKMAN. Pumps from wells and creeks. Yes; there is some irrigation.

Mr. HOPE. So, the farmers do know what they can expect from irrigation?

Mr. HICKMAN. No; I do not think so. They don't know the cost.

Mr. HOPE. Don't they know that the productivity would be increased?

Mr. HICKMAN. That is right.

Mr. HOPE. I am trying to find out if the people who are opposing the irrigation project are in the dark in their idea of what advantages and disadvantages there are.

Mr. HICKMAN. They are in the dark concerning the costs. They were told they could prepare and level ground for $30 an acre, and it can't be done. The cost of preparing that land, according to other figures, will be $100 an acre, and they don't have that kind of money. It is like buying the land back again. They are putting a mortgage on the farms for 40 years, and it will take the second or third generation before they can own the farms again. They will lose them through taxation. They can't pay the bill. That is the objection of not wanting the dam.

Mr. HOPE. What does this land sell for now?

Mr. HICKMAN. From $100 to $150 an area.

The CHAIRMAN. I want to jump out in another field where I shouldn't. You asked, or at least intimated, why there weren't more Members of Congress that came out and viewed the situation. I think the committee, under Mr. Hope, did more than any others did. They did make a tour of the United States by bus and at least saw various types of agriculture, type of activities in the country. Obviously, nobody can go over the United States and see all. But we did see more of it than any other committee. And, I want to call attention to the fact for the benefit of all those who have asked the question, and I have heard it asked before. If the Members of Congress do leave Washington on inspection trips, and even though they make the schedules as hard as possible and often sitting up all night, people start remarking how the Members of Congress are going off on a thousand junkets. They say we ought to stay in Washington and tend to our business there, instead of running all over the country. So, I hope when you hear Drew Pearson and other commentators talking about the junkets of the Congressmen, that you will be fair enough to see that we cannot know what is actually taking place without actually going out ourselves and finding out what problems the people have.

Mr. HICKMAN. A few more figures. The cost of the Kirwin Dam was given in 1947 or 1948, which if spread out over this territory, would amount to $150,000 per section. Then, you must add on 30 percent to that as increased costs. You take that amount of money and spread it clear down the entire length of the Solomon Valley, or even down the Solomon River, you couldn't spend that much money. It would be physically impossible to spend it, even when spread out the length of the Solomon River.

You talked awhile ago that somebody has to pay the bill. We realize that. It must be paid for. And if this money was spread out over the entire length of that valley, a larger number of people would be benefited and thus would be in a better position to pay back that which has been expended. But the way they are going to do it is to take out thousands of acres of good taxable land.

There happens to be a board of three, who have been handling the county expenditures. We three men figured up one day the cost of bridges and roads for this area that we feel could have been avoided if the land had been properly protected. We think it will cost as much to put these bridges and roads back which were destroyed in 1 year as it would cost to build terraces and ponds over the entire county. This may happen again next year. We don't know. It is hard to predict the water—this has been a freak year.

According to the Bureau of Reclamation, the dam will silt full in 50 years. If the dam had been there this year, it would have been 20-percent full of silt already. It was estimated there in one building in Manhattan there were 60 tons of silt. Part of that came off the territory from up here—and no way of getting it back.

You talk about the costs. We are all going to pay it! If this money had been spread out, our county alone would have saved a huge amount of tax money. We are spending part of our money and part of yours, and those are some of the expenditures that could be saved, if the money had been spent in the right places.

Mr. HOPE. How much per acre will this project cost—of the irrigated land?

Mr. HICKMAN. The last figure we had was around $19,000,000. I am not sure. However, they are going to raise the dam another 13 feet, which is going to increase the cost. That raise will cost a lot of money.

Mr. HOPE. That would be over $200 an acre.

Mr. HICKMAN. Of course they aren't going to pay the full cost.

Mr. HOPE. Somebody is going to pay it.

Mr. HICKMAN. I still insist on putting the money where it will do the most good.

Mr. HOPE. We are a little short on our figure. It is $2,000 an acre if my figures are right.

Mr. HICKMAN. Those are the figures they forgot to tell the boys below. You see, according to the Kansas law, they have to have a certain number of signers before they can form an irrigation district. Without that, the Bureau of Reclamation can't operate in Kansas.

This flood was terrible. And I am asking you gentlemen to hold up this appropriation until we try this soil conservation program. Don't pick out one little spot. This is the only project in the entire United States.

Mr. HOPE. You understand that this committee doesn't have jurisdiction over the reclamation projects?

Mr. HICKMAN. This committee is part of the group that had jurisdiction over the money.

Mr. HOPE. We are not trying to dodge any responsibility, you un-

derstand, but I am just pointing out that Congress has appropriated the $2,500,000 to start construction on the Kirwin Dam. I assume the Bureau of Reclamation is going out and spend that in order to get the project started. And there is nothing we can do about it.

Mr. HICKMAN. And, you are going to finish paying the bill—anywhere up to $30,000,000?

Mr. HOPE. I am just pointing out what the situation is and I don't know what the subcommittee can do about it at the present time, because the dam has been authorized by Congress. The funds to start construction have been appropriated by Congress and I presume the work will start.

Mr. HICKMAN. Yes; the dam was authorized by Congress, due to the fact we never had the actual facts put before them. I am sure a lot of people never understood the situation as it was presented to them by the Reclamation Bureau. They painted the picture before Congress as they did to the people in selling the proposed district down there.

Mr. HOPE. Understand I am not expressing any opinion here in contradiction to what you are saying as to the merits of the proposition. I am simply pointing out what the legislative situation is.

Mr. HICKMAN. I would like to know what happened to the proposed legislation in the last few hours in order to get it passed.

Mr. HOPE. As I understand it, the Bureau of Reclamation sent an estimate to the Senate covering the Kirwin Dam, and I believe the Glen Elder Dam, and another dam in Kansas. That was sent up by the Bureau of the Budget to the Senate, and the Senate Appropriations Committee put in the $2,500,000 for the Kirwin Dam. They dropped the other two projects for the present. The conferees met and as a result of the conference the amount the Senate had put in for the Kirwin Dam was left in.

Mr. HICKMAN. About 3 weeks ago this appropriation was submitted.

Mr. HOPE. I don't know what went on over in the Senate.

Mr. HICKMAN. At any rate I have a copy that it was taken out until next year.

Mr. HOPE. I don't know about that. Somewhere in the Senate the items were put into the bill, either by the committee or on the floor. It went into conference and the conferees kept it in. That is the history of it.

Mr. HICKMAN. I have a copy of a report here that was made to the Governor of our State, who was then Governor Frank Carlson. This was in 1947. The Department of Agriculture at Lincoln did ask the Governor of Kansas to appoint a committee to investigate and report on the possibility of water and soil control in the State of Kansas. He did appoint that committee and this is the report, and it is signed by 12 men. I am sure most of you will know them.

Mr. HOPE. I am sure the committee will be glad to have it. Are there any further questions. Thank you very much Mr. Hickman.

(The report referred to above is as follows:)

REPORT TO THE GOVERNOR FROM THE COMMITTEE ON SOIL CONSERVATION AND WATER RUNOFF CONTROL

I. WATERSHEDS SELECTED

In conformity with your instructions of December 14, 1948, the Committee on Soil Conservation and Water Runoff Control has, from the facts available, selected a number of areas within which a program of land use and water runoff control on a watershed basis, could be most feasibly initiated as follows:

	Square miles
A. Missouri River Basin:	
1. Black Vermillion	537
2. Dragoon Creek, including 110 Mile Creek	334
3. Walnut Creek in Brown County (the Nemaha watershed)	114
4. The North Fork of the Solomon River above the Kirwin Dam site and including Bow Creek	1,370
B. Neosho River Basin:	
1. The Neosho River above Council Grove	265
2. The Cottonwood River above Marion	514

These have been listed in order of preference separately for each of the two major watersheds. This was done by reason of the fact that the surveys of the Soil Conservation Service in each of the valleys will be transmitted to the Eighty-first Congress as separate reports. While it may be assumed that both reports will receive consideration, it appeared to the committee that Kansas should be prepared to participate in a project or projects even though congressional action on one of the watershed reports be delayed.

II. FACTS CONSIDERED

Before reaching these conclusions the committee reviewed the over-all program of the Soil Conservation Service, as explained by Soil Conservation Service representatives, and your committee wishes to acknowledge the splendid cooperation given by these gentlemen.

This review showed that the soil-conservation flood-control program has two distinct phases:

1. Conservation on the farms as carried out by farm owners and operators in accordance with plans developed with the technical assistance of the Soil Conservation Service technicians.

2. The design and installation of structures for water and silt detention which are essentially too large for individual farmers to finance and which affect downstream conditions and thus provide benefits of community value.

The committee also found that on-the-farm practices in Kansas under the first phase are now making excellent progress, as is evident by the fact that soil conservation districts have been organized in 92 of the 105 counties. These districts are functioning under the Kansas soil-conservation district law (Ch. 2, art. 19), 1937.

An important factor in the soil-conservation program is the dependence upon local interest and cooperation. None of the farm practices nor the larger structures can or will be carried out except as desired and supported by the people upon whose land such work is undertaken. As a matter of fact, the service policy of the Soil Conservation Service is that the water runoff control projects constructed at the expense of the Federal Government should not be undertaken unless or until operators of at least 70 percent of the land in the watershed are utilized on-the-farm practices of land and water management. This fact has undoubtedly contributed to some lag in soil-conservation progress, but it appears to be a fundamentally sound approach to the problem.

It is pertinent to point out that the second phase of the soil-conservation program under which projects contemplated in this report would be constructed, is relatively new and consequently not fully understood by the people of Kansas. As a matter of fact the extent to which these water retention reservoir and erosion control structures will effect peak waterflow conditions has not been actually determined by experience. Certainly the cumulative effect of such structures over a number of adjacent subwatersheds upon the peak flow of a major stream is a matter of calculation with a limited volume of experience upon which to base such calculations.

Consequently your committee believes that such project or projects constructed in Kansas will serve not only as a test to determine additional facts in this direction but will also serve as a demonstration of the more dramatic features of soil conservation. Because of these facts and the tremendous importance of such a program to the ultimate conservation of Kansas soils and indirectly to the agricultural economy of Kansas it is highly important that the first project or projects be carefully selected from the viewpoint of success and the accumulation of facts within a reasonable time.

It appeared, therefore, that the basic factor in selecting an area for a test demonstration is that such area be large enough to secure the facts on cumulative effect between subwatersheds and yet not so large as to prevent the securing of tangible results within a reasonable time.

It is also important to note that any funds available from the Federal Government will be for the design and installation of control structures and does not include any amount—

(1) For the devices and instruments necessary to secure comparative records;

(2) For the compilation of such test data; nor

(3) The evaluation of the benefits to the farms as well as the effect upon water and silt control.

Accordingly, if such highly important information is to be made available, it is necessary to recognize that some provision must be made to finance and effectuate this part of the program. It is the concensus of the committee that this can and should be done by one or more of the existing State agencies but that specific allotment of funds will need to be made available to such agency for such purpose.

The matter of possible needed legislation was also considered. The committee believes that existing laws will not interfere with the initial development of a project and that the early experience with such a project is necessary to provide the basis for any changes which may be required.

III. PRESENT STATUS OF SOIL CONSERVATION FLOOD CONTROL SURVEYS IN KANSAS

The committee has been advised, that the survey and report covering the entire Missouri River watershed including Kansas have been completed and it is anticipated will be ready for presentation to the Eighty-first Congress.

The survey and report on the Neosho watershed was completed some time ago and it is also anticipated that this report will be submitted to the Eighty-first Congress.

The Soil Conservation Service has started a more detailed survey on the watershed of Snipe Creek in Marshall County a tributary of the Black Vermillion, a subwatershed in the Missouri River Basin. This area was selected because—

(1) Eighty-five of the 100 farmers in the watershed area are now carrying out some "on the farm" soil-conservation practices.

(2) This watershed represents an area which needs immediate attention to conserve the land.

(3) It lies within a soil-conservation district which has been organized for a period of years.

The committee inquired as to the possibility of a similar survey on a subwatershed in the Neosho Basin but was advised that funds for such other survey were not available and that such further surveys depended upon additional appropriations for such work during the next fiscal year beginning July 1, 1949.

It was further determined that an educational program dealing with the over-all Missouri Basin program in Kansas has been prepared by the extension service of Kansas State College and that report will probably be available in the near future.

IV. MAPS AND STATISTICS

The accompanying maps and watershed data pertaining to the respective sites selected for possible projects were prepared under the direction of Mr. R. V. Smhra, of the State department of water resources.

V. SUMMARY

To summarize, the major considerations in selecting the areas, and the order of their preference were—

(1) The relative importance of securing prompt action in improved soil-management practices and water-runoff control in the respective areas in Kansas.

(2) The relative probability of suitable local cooperation in development of the project as indicated by—

(a) The present status of soil-conservation practices on the farms of the watershed; and

(b) By the interest of existing groups organized on a watershed basis.

(3) The availability of field data in sufficient detail so that actual development could be undertaken with a minimum of delay.

(4) The location with reference to soil and geological differences between areas.

(5) The size of the watershed.

(6) The accessibility of the several watershed areas to improved highways.

(7) The relationships of the respective watersheds to contemplated flood-control projects.

In submitting this brief report, the committee recognizes that there are additional facts that can be developed in connection with a program as extensive as this, but because time was of the essence has confined its deliberations to the essential facts related to the pertinent question of project locations.

Respectfully submitted.

Committee on Soil Conservation and Water Runoff Control: P. H. Lambert, Chairman; H. E. Myers; John Ferguson; Geo. Hedrick; Geo. Knapp; Harvey E. Bross. J. A. Hodges; Don Christie; Maurice Fager; Fred Sykes; H. S. Hinrichs; John C. Frye.

Mr. HOPE. Our next witness is Mr. Clarence Brown, of Quinter, Kans., secretary-treasurer of the Kansas Association of Soil Conservation Supervisors. Mr. Brown.

STATEMENT OF CLARENCE BROWN, SECRETARY, KANSAS ASSOCIATION OF SOIL CONSERVATION SUPERVISORS

Mr. BROWN. Mr. Hope and Congressmen, I am Clarence Brown, secretary-treasurer of the Kansas Soil Conservation Supervisors. An official statement has already been made for the Kansas association, but I have a few statements to make as to the general feeling of the farmers and the supervisors with whom I come into contact with.

The general feeling as I see it is this. They would like to have priority given to the agricultural plan of soil- and water-conservation program and flood prevention. That would be priority over the big dams, and to have a demonstration of a typical watershed conservation plan, such as the Ouachita project. Also to utilize more fully existing agencies working toward soil and water conservation.

We organized something like 3 years ago in our county for soil conservation. It seems like for every farmer a technician get around to help there are two more applications that come in. And it seems likely there is beginning to be a lot of confliction. They come to me with this question: "We have this soil conservation. What are we going to do, just sit around and watch our farms wash away?" I would like some way of setting up the utilization of technical assistance to the farmers. Also to study and encourage conservation tillage methods.

I think it was this spring that Embert Coles told me they had been getting about $6,000 a year for tillage work, and that this was taken away from them. I think the same thing has happened at Garden City and possibly Hays. Some of these were very instrumental works which has been cut off because of lack of appropriations. I think a continuation of these tillage studies should be continued.

STATEMENT OF FLOYD BREEDING—Continued

I believe that is all I have at the present time. Thank you for the opportunity to appear before this meeting.

Mr. HOPE. Are there any questions? Thank you, Mr. Brown.

I believe Mr. Breeding desires to reappear. Mr. Breeding.

Mr. BREEDING. We expected to have some testimony from Johnson and Ulysses, Kans. Those two counties had a terrible flood this year. Inasmuch as no one seems to be here from either of those two towns, I would like to make some remarks as that happens to be in our area.

There is a Bear Creek that originates in the State of Colorado and comes down into Kansas to an end, the same end as the White Woman Stream. The State highway department lost in the neighborhood of $400,000 worth of bridges and also the Santa Fe Railroad lost one bridge. A great portion of the irrigated valley near Ulysses was inundated and covered with debris. Tree trunks covered hundreds of acres.

One other problem—the Cimarron River. It runs approximately 100 to 120 miles. In 1942 we had a terrible flood on this river, which took out millions of dollars worth of highway bridges and railroad bridges at the expense of the taxpayers of the State of Kansas. And, we the people of the State of Kansas suffered. I understood the Rock Island lost a bridge that cost $3,000,000.

I want to ask if this area is included in any program that the Federal Government has set up in the study of soil conservation in that area?

Mr. HOPE. Let me see; the Cimarron River and the entire basin is included in the studies made of the Arkansas River and its tributaries. That is an over-all interdepartmental study, and when the report is made in 2 years, it will be an interdepartmental report. That will take care of the Cimarron. I don't think there will be any activity on it until the report comes in.

Frankly, I can't remember your question as to Bear Creek. It flows across the country for some distance and sinks into the ground. It is not a tributary of any river. But I would assume that the Army engineers would, upon request, if they are not doing it already, make a study of the Bear Creek Basin. I will take it on myself to see whether they have included it in their study of this area, and if they haven't, I will ask that it be included.

Mr. BREEDING. That is in the study of the Arkansas River?

Mr. HOPE. Yes; of the Arkansas River and the tributaries. I think quite likely it is a part of the study, but if not, I am sure they will include it if the request is made.

Mr. BREEDING. I believe that is all.

Mr. HOPE. Thank you again, Mr. Breeding. Let me say before proceeding that I have a letter from Mr. William H. Painter, chairman of the Meade County Soil Conservation District, in which he discusses the Cimarron River and the flood situation on that river. He wants his statement filed as part of the record, and at this time I will insert it into the record.

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(The letter and statement referred to are as follows:)

MEADE COUNTY SOIL CONSERVATION DISTRICT,
Meade, Kans., October 29, 1951.

Hon. CLIFFORD R. HOPE,
Member, House of Representatives, Colby, Kans.

DEAR REPRESENTATIVE HOPE: The hearing at Colby on agricultural flood control comes at a time when it is impossible for me to attend, but am sending a report for Meade County Soil Conservation District which I wish to be entered in the minutes.

I was well pleased with the report from the Secretary of Agriculture and his viewpoint expressed at Gatesville, Tex., and I believe it up to us to see that he has the backing to carry out his statements on flood control for agricultural lands.

We in Kansas feel we are as important as people of other States and I know the people are behind you and will give full support of an agricultural flood-control program and appropriations inducive to a more rapid establishment of soil conservation practices to the land prior to the construction of other flood-control structures which may or may not be needed if the water is taken care of where it falls.

Very truly yours,

WILLIAM H. PAINTER,
Chairman, Meade County Soil Conservation District.

MEADE COUNTY SOIL CONSERVATION DISTRICT,
Meade, Kans., October 30, 1951.

To: Committee on Agriculture of House of Representatives.
From: Meade County Soil Conservation District, Meade, Kans.
Subject: Agriculture flood control.

The Meade County Soil Conservation District wish to go on record as being in favor of a coordinated agriculture flood-control program and endorses the Department's policy of cooperating with other agencies to control floods.

Primary interest of the Meade County Soil Conservation District concerns the Crooked Creek watershed which involves about 600,000 acres of crop and range land in this district and another 2 to 300,000 acres in adjoining districts to the north.

Flooding of Crooked Creek bottom occurs when about two or more inches of rain falls in any one portion of the watershed. If such a rain is general, the flooding is much more serious.

The runoff waters of the watershed flood thousands of acres of fertile bottom land capable of producing valuable crops and beef. In 1951 the Crooked Creek flood was the greatest. Usually it occurs one or more times each year. This year the flood washed out railroad fills and bridges, State and lesser subdivision roads and bridges; caused farm losses of buildings and livestock; jeopardized municipal services of Meade and Fowler, etc. The greatest loss is caused by the erosion of thousands of acres of our top soil, which, when removed from its place is lost forever. Our soil is the most important natural resource of the Nation and in no nation is it more neglected.

The creek bottom itself is flat and meandering with no definite channel. Backwater has ruined hundreds of acres of land by raising the water table and surfacing alkali deposits. Reclamation of these areas can only be accomplished by flood control and drainage.

The control of upland runoff water before it reaches the flood plains is the first and main objective in any control measure. This can be initiated by rapid establishment of sound conservation practices to the land starting at the top of the drainage area and progressing downstream with coordinated watershed treatment of stubble mulching and crop rotation; contouring and terracing; reseeding to grass submarginal land and waterways; construction of soil erosion and stock-water dams; pasture-land treatment; and the construction of larger flood-control structures, if needed, on downstream.

Small watersheds have been controlled by coordinated efforts of adjoining landowners in small areas. Similar results can be obtained on larger drainageways only the progress is much retarded by various obstacles.

The Meade County Soil Conservation District endorses a systematic approach to flood control and the necessary appropriation inducive to a rapid establishment of these measures to the land.

Very truly yours,

WILLIAM H. PAINTER,
Chairman, Meade County Soil Conservation District.

The CHAIRMAN. Mr. Painter came down to Texas to be heard down there 2 weeks ago. So I know he is very much interested in it.

Mr. HOPE. Mr. Painter advised in his letter that it was impossible for him to be here today, so he sent the statement to be filed on behalf of the Meade County district.

I see a gentleman from the audience desires to be heard. What is your name please?

Mr. STANLEY MARR. My name is Stanley Marr, of Jewell County. The Congressman from Texas said they paid 50 percent on PMA payments in Texas. I am wondering how they get by with it, when they are paying around 75 percent here in Kansas. Why can't they cut the payments to 50 percent in Kansas and take the other 25 percent to hire more technicians to get out and do the work, taking care of the rain where it falls?

Mr. HOPE. We are glad to have your suggestion, Mr. Marr. We will take that under consideration.

Mr. Bird, do you have something to place in the record?

Mr. HARRY BIRD. Yes, I do. These men were unable to be here today and have requested their statements be filed.

Mr. HOPE. We will be glad to have them.

(The following statements were submitted by Mr. Bird for incorporation into the record of this hearing.)

STATEMENT OF COBURN JONES, SECRETARY-MANAGER, CHAMBER OF COMMERCE, GARDEN CITY, KANSAS

Mr. Chairman and members of the committee, my name is Coburn Jones, and I live in Garden City, Kans. I am secretary-manager of the Garden City Chamber of Commerce, an organization incorporated under the laws of the State of Kansas for nonprofit. Our membership is composed of approximately 520 of the leading businessmen and farmers of Garden City and Finney County, Kans. Part of the purpose of this organization is to promote trade and further the betterment of agriculture; therefore, the Garden City Chamber of Commerce is vitally interested in conservation of soil throughout its trade territory.

We have been active in various flood-control associations, and we are fully aware that to prevent disastrous floods many methods of conservation will have to be tried.

We believe one of the principal sources to prevent not only floods but soil erosion is through the method recommended by the Soil Conservation Service, and that is in the retaining of the water where it falls.

In the summer of 1949, and again in the summer of 1951, several thousand acres in Finney County, west and northwest of Garden City, were flooded, and many acres are still under water at the present time due to improper conservation practices, or no conservation practices. During these two summers, a lake, covering several hundred acres, developed at the northwest part of Garden City, which would have been disastrous to several hundred homes in the north part of Garden City, had it not been for a railroad grade which created a temporary dam and held the water out.

While it was threatening the city of Garden City, although it did not enter, it was creating havoc with quite a few farmers immediately west and northwest of Garden City.

Also in the summer of 1951, there were several hundred acres of land immediately east of Garden City, which were under several feet of water for quite some time, due to runoff on higher ground.

It has been estimated that the damage in 1951 to Finney County and Garden City, including crops, soil erosion, highways, railroads, etc., would amount close to $3 million. Most of this loss would come from runoff water and not the Arkansas River.

We, therefore, urge this committee to do all within their power to create more soil conservation districts and stress the importance of that work.

STATEMENT OF JOHN R. LATTA, AGRICULTURAL SUPERINTENDENT, THE GARDEN CITY CO., IN BEHALF OF THE GARDEN CITY CO.

Mr. Chairman and members of the committee, my name is John R. Latta. I live in Garden City, Kans. I am agricultural superintendent of The Garden City Co. and it is my responsibility to supervise the leasing of approximately 25,000 acres of land owned by the Garden City Co. in Finney and Kearny Counties.

The Garden City Co. owns and operates a beet-sugar refinery in Garden City, Kans. Sugar beets are grown on a portion of our irrigated land in rotation with alfalfa, wheat, and milo. At the present time about 5,000 acres of our irrigated land is in alfalfa. The sugar beets grown on our land together with sugar beets grown on other irrigated land in nine counties in southwest Kansas are used in the manufacture of beet sugar at our refinery in Garden City, Kans.

I will confine my remarks for this hearing to the damages incurred from floodwaters to a tract of land comprising 5,040 acres, located approximately 15 miles northwest of Garden City, Kans.

The loss of crops and damage from erosion caused by floodwaters coming from drainage areas northwest of this tract of land has been growing progressively worse during the past 3 years. The biggest loss has been during the months of June, July, and August of 1951. Altogether the average rainfall for the years 1949 and 1951 was above the 50-year average of 18.50 inches, the actual rainfall that fell on this tract of land did no damge because of the good farming practices used by our farmers in that area.

A portion of this land is irrigated by four large irrigation wells and the remainder of the acreage is farmed as dry land. I would estimate that the actual loss in crop income due to the field floodwater on this tract of land this past summer to be $100,000. At one time the water flowed over most of this land for a period of 2 weeks. The floodwater came onto this land at theree different points. The largest stream of water was approximately one-half of a mile wide and at the deepest point it was 3 feet in depth.

The loss from erosion on a portion of this land was very high. In some places the volume of water was so great that it carried away fairly large amounts of surface soil. One might ask why this amount of erosion occurred but this tract of land does not have a steep slope and will absorb water from our natural rainfall with no apparent damage from erosion.

The drainage areas of several different draws northwest of this tract of land originate in northwest Kearny County and southeast Greeley County. I have talked to long-term residents who have lived in this area for 50 years and these large field-water floods have never occurred to the extent of flowing across this tract of land before 1949. During the past 5 to 8 years large areas of grassland have been plowed for the production of wheat and milo within the boundaries of these watersheds.

Although I am not familiar with the areas of these watersheds or the degree of slope, type of surface soil, and type of subsoil, I believe it would be desirable to have a survey made of these areas by the Soil Conservation Service. This type of survey would determine the economic feasibility of using terraces, strip cropping, stock ponds and other suitable practices used to keep the rainfall on the land where it falls.

Mr. Chairman and members of this committee, I hope that you will take some action and make recommendations as to how these field-water floods can be avoided in the future for the benefit of the farmer citizens in that area.

STATEMENT OF G. W. EGBERT, INGALLS, KANS.

My name is G. W. Egbert. I am a farmer at Ingalls, Kans., and president of the Kansas Association of Wheat Growers. I have farmed in Gray County, Kans., for 20 years and have lived there all my life.

During those 20 years that I have farmed for myself, and before that when I helped my father in his farming operation, I have seen the problem of water runoff and its child, soil erosion, grow in intensity and become not simply the problem of one farmer managing the soil of one farm, but a community and area concern.

The Kansas Association of Wheat Growers has recognized this problem and the question of sensible, practical, and effective soil conservation not only in our own Kansas wheat-growing area but in the surrounding States which, by topography, are tied into our drainage and watershed patterns. We have endorsed widespread conservation practices and have tried to carry the message of conservation as a necessary and profitable program, but we are simply a voluntary association of growers, and our efforts of necessity must be limited to a somewhat missionary role. We recognize that the whole picture of water management and the control of erosion is a highly technical problem for soil scientists, hydrologists, and engineers, and since it is an interstate situation, one that must be dealt with by Federal authorities. It is my own observation that the greatest damage to the land occurs on fields lying close to natural drainage channels. Much land, which can be termed submarginal not on the basis of inherent fertility but because of the soil-management problem it presents, has been taken out of grass and put into crop production.

Anyone who has lived as I have all my life in the high plains area does not need to be a water engineer to know that heavy grass cover holds rainfall and retards runoff more effectively than any other natural land feature. It is my feeling that coordinated soil conservation study will prove this observation on an engineering basis, and that through education and through the technical assistance which you gentlemen ultimately control, we will need to return critical drainage areas to grass, which we now know is just as profitable as crop production on that type of land.

In view of our national situation it is doubly important that our lands be improved rather than to continue the present course of attrition and destruction. In increasing and coordinating the widest application of soil-conservation measures we will be working toward three results: The conservation of soil fertility, the lessening of water flow into the larger streams, with the resulting simplification of flood control on those streams and the guaranty of the fullest production of food grains and livestock for our own and for world security. This country's agricultural production constitutes, in my opinion, one of the greatest weapons on the side of democracy. Any measures this committee takes to strengthen that production becomes not only a local but an international service.

Mr. HOPE. Is there anyone else who would like to be heard?

STATEMENT OF G. E. SMITH, COLBY, KANS.

Mr. G. E. SMITH. I am G. E. Smith of Colby, Kans. I have one question I would like to ask. As I understand it, the Reclamation Bureau is responsible for only the flowing streams, is that right? The Reclamation Bureau has charge of construction on flowing streams?

Mr. HOPE. You mean as contrasted with pump irrigation?

Mr. SMITH. Yes. And the Conservation Bureau has charge of nonflowing streams, is that right? Does the Department of Agriculture contend if their program is fully installed that the cost of the reclamation projects would be reduced?

Mr. HOPE. Are there any members of the committee who want to answer that question for Mr. Smith?

Mr. HILL. If I understand the question correctly, it is whether the agriculturists contend that when their program is fully installed that the cost of the necessary reclamation projects would be reduced. Is that correct?

Mr. SMITH. Yes, that is the question.

Mr. HILL. In other words, if the water runoff is reduced to half, wouldn't that reduce the cost of the necessary reclamation dams by half?

Perhaps you are getting flood control mixed up with reclamation. I come from a reclamation area that is not part of flood control. Take the Big Thompson——

Mr. SMITH. In this country out here where the Conservation Department would do most of the work and where they are asking for additional money to tie in with the reclamation they are going to hold the water on the land, and that will reduce the runoff. So when the water gets down to the main stream, there will be a reduction in the amount of water that will be handled, so won't that reduce the amount of money that is necessary for them? If so, perhaps some of the money could be allotted to other things.

The CHAIRMAN. It seems to me it depends on who you ask the question. We have had testimony before this committee claiming that this upstream program would just solve all sorts of problems. We have actually had people testify that if we did do the upstream work you wouldn't need anything below—that it would solve everything. We have had people who said it was hardly worth while to spend the money upstream and that it would accomplish little. So it depends on who you asked, but I do think it is fair to say that 2 weeks ago we were discussing this same thing at Fort Worth. One gentleman took the position that on some projects complete treatment of the upstream area would make reclamation in the lower areas less necessary and therefore reduce the costs. He was frank enough to say that if you retained a percentage of the water upstream you would reduce the amount of water runoff and that you would find it difficult to carry on the reclamation projects downstream because you wouldn't have enough water to supply the people, and that you would have to make a survey of each project to determine if the advantages offset the disadvantages.

Mr. SMITH. In that case you can determine the allocation for the reclamation project and move that over to conservation to reduce the conservation cost.

The CHAIRMAN. That is the way it ought to work, but, unfortunately, our Federal Government is so big it generally doesn't work that way. This committee has no more jurisdiction over that than you do. We do not have control of reclamation projects, and all we can do is to make the recommendation as to authorizing of this agricultural type of work. I suppose you are wondering why this committee doesn't handle everything. There is no group of men that has the time or the ability to handle all the details of Government, and it has gotten so big it has become necessary to divide it up, which, of course, results in loss of efficiency.

Mr. SMITH. Isn't there any way of determining whether or not a reduction can be had?

The CHAIRMAN. Of course, the Soil Conservation Service does submit a survey on a given watershed and ask us to authorize the work.

This survey also contains an estimate of the costs, but until that survey is made and submitted to Congress, why, I don't think there is anybody that can go out and pull a project out of thin air and tell you what it is going to cost. But when the survey is made, it will contain the estimate you speak of.

Mr. SMITH. There will be reductions?

The CHAIRMAN. There may be or may not be.

Mr. HILL. I might add a word that will clear up one thing. When the Hoover Commission made a report on the Agriculture Department and the other departments, the idea they suggested was to correlate all the groups, and I don't think they ever made a smarter remark, because there is no reason in the world why the Interior Department, the Agriculture Department, the Corps of Army Engineers, and right on up to the top, can't work together.

Yesterday we had a fine map put before us and there were two departments operating in the high mountain areas side by side and almost integrated within themselves. That shouldn't happen, but it does. We haven't considered in times gone by—and I, for one, think that is the biggest job we have to do—to cut out the overlapping, the activities of one group not being integrated with another as it should be. They get along very well now in most cases, but they would get along better and save a lot of tax money if they could be put under one head.

Mr. HOPE. Let me tell you my experience. About 3 years ago I introduced a bill in Congress dealing with conservation, in which I proposed, among other things, to transfer the Bureau of Land Management of the Department of the Interior and the Bureau of Reclamation into the Department of Agriculture, so we could do what Mr. Hill has talked about. But you should have heard the howls that went up when we suggested transferring the Bureau of Reclamation into the Department of Agriculture, where presumably it would be dealt with as an agriculture proposition. The Hoover Commission came along and made the same recommendation, and they even went further and suggested it also include the Army Corps of Engineers.

Now, getting back to your question about whether it would cut down the cost of reclamation dams if we carried out a program of this kind, it seems to me, as far as reclamation dams are concerned, where you have built them for one purpose, you have a number of acres you want to reclaim, and it will take a certain amount of water to reclaim the land. If that was just the problem, it would be simple, but you don't have just one problem; you have multiple problems. Thirty or forty years ago you could justify a reclamation project on the basis of irrigation alone. But now, on all these projects, there is involved flood control, flood prevention, irrigation, wildlife, hydroelectric power, and navigation, plus some other things. And you apportion the costs out among those things. And you can put any estimate on it you want to

and say wildlife is worth 10 million dollars on some dam, and they come in and justify it. So, we don't have a situation now that I know of where you would simply have a straight reclamation dam.

Therefore, it costs more to build a dam like the Kirwin project, because you deal not only with reclamation, but flood control and other subjects as well. These multiple-purpose dams must of necessity be larger than just a straight reclamation dam. However, the straight reclamation dam just doesn't exist any more.

Are there any more questions? Thank you, Mr. Smith.

I believe Mr. Bross, of the PMA, wants to say something. Mr. Bross.

STATEMENT OF HARVEY BROSS, PRODUCTION AND MARKETING ADMINISTRATION

Mr. HARVEY BROSS. I am Harvey Bross. I would like to clear the record a little bit on the cost of contribution to the construction of stockwater dams.

Mr. HOPE. Yes; I am sure the committee would like to have this cleared up.

Mr. BROSS. As I remember the 1951 figures in setting out the contribution to the construction of these dams, the average cost for the State was about 21 cents. The payment in 1951 for the cost of moving dirt was 12 cents per cubic yard, which is less than 6 percent. In addition to that, the producer supplies the riprap and does that work along with some additional work. So, you get it done with about 55 percent contribution.

I can understand why there is some misunderstanding as to what the contribution might amount to, because that is the State figure and State average. Then the county committees might reduce the 12 cents to a lower figure, and in some instances we have some county committees that have lowered the rate of contribution. Also, the competition between contractors in one county compared to another county, and the ease with which you can move dirt in one county as compared to another, no doubt affects the costs of construction. In some counties the competition is more keen. Dirt is relatively easier to move. This results in maybe 14 cents per cubic yard for building a dam in one county as compared to 25 or 26 cents a cubic yard in another county. This all tends to distort the picture quite a little. If you happen to be in one of the counties where the cost of construction is down, you will have a different viewpoint than a person lives in a county where the costs are higher. In fact, it is hard for us to understand how a contractor makes any money in these counties where the costs are so low. We wonder if he makes a depreciation on his machinery.

I believe that is all I have to say.

Mr. HOPE. Thank you very much Mr. Bross.

Is there anything further? If not, the committee desires to thank each and every one of you that have appeared and testified, and for the splendid assistance you have given the committee in the way of informing us as to what the situation is in this area.

We also desire to thank all of you who came as spectators and listened to the hearing.

I am sure you feel as I do: that this has been a very educational meeting, and the committee will go away feeling very much enlightened and with a better understanding of the situation than we had before.

Mr. Poage, I am wondering if you have anything to say at this time?

The CHAIRMAN. I just wanted to repeat what Mr. Hope has said: that the committee appreciates the help you have given. It is extremely helpful to the committee to have the kind of information that has been given here today.

We will be at Topeka for a hearing at 9 a. m. tomorrow, and we will be happy to have anybody who cares to come down do so.

I also expect that tomorrow the people down that way will be laying the blame on you folks as you did Bill Hill and the folks from Colorado. [Laughter.]

Then, the day following we will be in Sioux Falls, S. Dak. We are trying to get some idea over a broad area, and the public is invited to all the hearings wherever they are held.

We thank you folks again for your helpfulness.

Mr. HOPE. I think I should take this occasion on behalf of all here from western Kansas to express our appreciation to Mr. Poage, chairman of the committee, for scheduling this meeting in western Kansas. I know we all feel grateful to him for giving all of us a chance to express our viewpoints and lay our problems before the committee.

(The following statements were submitted for incorporation in the record of the hearing:)

THE NEED FOR AUTHORIZATION OF THE MISSOURI BASIN AGRICULTURAL PROGRAM

(W. V. Lambert, dean, College of Agriculture, University of Nebraska)

House Document 373 outlines in much detail plans for "an agricultural program for the Missouri Basin." This program, large in scope and comprehensive in detail, would provide for a balanced and orderly development, over a period of some 30 years, of the great resources of this vast area. It provides also for greatly stepping up the application of soil-conservation practices to the land and for increasing the research and educational activities so essential if the many phases of such a program are to be carried out soundly and conservatively. It wisely provides for a progressive development of the program and for participation of farmers and local and State governments with the Federal Government. I want to describe briefly what to me are some of the important phases of this program.

CONSERVATION OF SOIL AND WATER RESOURCES

Only within the last 20 years have we as a nation become conscious of the importance of conserving our vital soil resources. The Missouri Basin comprises nearly one-sixth of the land area in the United States. Much of the land in this area is very fertile and highly productive and it is vitally important that we take steps to protect this great resource. Through the activities of the Soil Conservation Service, the Agricultural Extension Service, the Production and Marketing Administration, and other agencies, a good start has been made in this direction. However, only the surface of the total problem has been scratched. What is needed now is to step up the tempo of these activities and to strengthen and extend them, first in the most critical watershed areas and later into other areas. These steps, in my judgment, should provide at least for the following things:

1. Getting greater participation of farmers and local governments in this program. This participation should provide for financial as well as other assistance.

2. The establishment of priorities in undertaking conservation activities. Areas with the best resources and those subject to the greatest damage should receive earliest consideration and help.

3. Conservation practices should be handled on a watershed basis so as to get the greatest good per dollar invested. Land under good practices should be protected from losses through erosion and by siltation from areas on which no conservation practices have been established. This may mean that provision should be included in any authorizing legislation that would encourage more active participation by local governmental units.

4. Any authorizing legislation should provide for the greatest possible cooperation with State governments. Should the watershed approach be used, some provision should be included to provide for getting coordination between soil-conservation districts and watershed groups since watersheds generally will cut across SCS district lines.

5. Any legislation authorized should provide that expenditures under the agricultural conservation program and other federally supported programs be made so as to promote the maximum development of the total conservation program as worked out by State, Federal, and local authorities.

6. In many parts of the Missouri Basin moisture is a limiting factor to production. In much of the area wind erosion does as much or more damage than water erosion. Consequently, any program authorized should stimulate adoption of all possible practices aimed at keeping water on the land and in preventing soil blowing. These would include stubble mulching, strip cropping, keeping land unsuitable for cultivation in grass, shrubs, and trees. These, of course, would be in addition to the building of terraces where needed, use of contour cultivation, and of all other practices valuable in conserving vital moisture supplies.

7. Authorizing legislation should provide for strengthening research and educational programs in the basin since no program will be sounder than the factual foundation on which it is built.

PROTECTION AND DEVELOPMENT OF VITAL FOREST RESOURCES

Much of the water supply used for irrigation in the Missouri Basin and for replenishing the vast underground water resources in parts of the basin has its origin in the forested areas on the eastern slope of the Continental Divide. Every possible step should be taken to maintain and improve these forested areas. Not only are they vital as a source of water but they have great potential as a source of timber and pulpwood. These latter resources should be developed to bring greater industrial development to the basin. This would provide diversification in the way of employment and would add greatly to the stability of the region. Much of this program can be accomplished by strengthening existing activities of the United States Forest Service and through stimulation of the greater activities in forestry by State governments. Enactment of the basin program, I believe, would stimulate greater activity in forestry on the part of State governments.

While the growing of trees for the production of lumber and other wood products will never be a large commercial activity in the Missouri Basin area east of the Rocky Mountains, except in the Ozarks of Missouri, there is great need for stepping up tree planting in this area for other purposes. Trees and shrubs in the form of windbreaks and shelterbelts add tremendously to the beauty and welfare of people in the Plains. The building of many large reservoirs in this region will create more recreational opportunities and there is need for strengthening and coordinating the efforts of the various agencies interested and involved to a greater or less extent in developing these facilities. I refer to the United States and State forest services, fish and wildlife services, the Soil Conservation Service, the Bureau of Reclamation, and others. Activation of the basin program would stimulate more orderly development of such facilities.

Strengthening of the educational and research programs in forestry are also needed. Very little has been done in the selection of better-adapted varieties of trees and shrubs for the Great Plains. I am certain that efforts in this direction would bring better-adapted varieties just as similar efforts have brought great improvements in many of our cereal and vegetable crops. Research is also needed on such factors as proper spacing of trees in shelterbelts for the greatly differing environments to be found in the Missouri Basin, methods for the care of young trees and for the control of diseases and insects affecting them. Much

could be accomplished by strengthening the forestry educational program and I would hope that any authorization of a basin program will give due emphasis to the educational aspects as well as to other phases of forestry.

BRINGING THE AGRICULTURAL PROGRAM ON A PAR WITH THE PICK-SLOAN PROGRAM

For many years the Bureau of Reclamation and the Army engineers have been actively developing reclamation and flood-control programs in the Missouri Basin. These are important programs that have brought enormous benefits to this region in the way of more irrigated land, electric power, flood control, and greater recreational facilities. They should be continued and strengthened in line with the program that has been authorized.

There is now vital need for strengthening the agricultural conservation and related activities in the basin. This is important for two major reasons. First, agriculture is the primary industry of the region. Its capacity for food production is enormous because of the large land area and the natural fertility of the soil. This resource is very important to the national welfare and as a Nation we should make every reasonable effort to protect it. The Missouri Basin agricultural program, if authorized and carried through, would provide in great measure for that. Second, this program should be authorized and carried through to protect the millions of dollars that the Government has invested in reservoirs and flood-control structures in the Missouri Basin. Much evidence is available to indicate that if there were proper development and management of the watersheds above the reservoirs, the rate of siltation in these structures would be greatly delayed. Such practices, if widely applied, should also reduce materially losses from floods. I do not believe they would control floods entirely but they would reduce the rate of runoff and hence the magnitude of floods. Such practices would also keep a higher percentage of the rainfall on the land where it would be available for crop and human needs.

Both the Pick-Sloan and the agricultural programs are vital to the future development of the Missouri Basin. The former got away to an earlier start and great progress has been made on it. What is needed now is to step up the agricultural program so that it may supplement Pick-Sloan activities. Development of both programs will aid materially to the stability of the Missouri Basin and to national prosperity.

RESEARCH AND EDUCATION

A sound factual basis is essential for the orderly and economical development of any program. Such facts are obtained largely through research. This, in turn, must be supplemented by a strong educational program to insure putting these facts into use by the folks on the land. The importance of these programs is out of all proportion to their total cost but they are so vital that any authorization for a Missouri Basin program should make adequate provision for them.

Fortunately the States and the Federal Government have been conducting research for many years. As a result much information is available to help guide the development of any basin program authorized. Because of the tremendous size of the basin and the great diversity of problems in this area, the research done to date has not been sufficient to answer nearly all of the problems confronting farmers in the Missouri Basin, or to properly guide development of a greatly stepped up agricultural conservation program. Naturally this program must be varied to get answers to the many problems involved. Broadly, they would include studies in such fields as the following:

1. Soil surveys and land classification. These are basic for all research and action programs and should be pushed as rapidly as possible.
2. Land and water management problems. These would include many different types of studies which would vary from region to region.
3. The development of better grasses and legumes.
4. Irrigation and drainage studies aimed at preventing loss of land through seepage and deposit of minerals unfavorable to plant growth.
5. Improvement in conservation practices and techniques, including cultural practices and engineering problems to cheapen and improve terrace building, handling water runoff, etc.
6. Studies relating to the use of fertilizers in the semiarid region characteristic of much of the Missouri Basin.
7. Weed and insect control.
8. Research essential to the establishment and maintenance of shelterbelts and the development of species better adapted for the plains.

The educational program needed would involve principally the strengthening of the cooperative extension program which has functioned so effectively over many years. All of the State and Federal agencies concerned with research and education in the Missouri Basin have cooperated fully in developing the program outlined in House Document 373. I believe the programs outlined therein would contribute greatly to sound development of the Missouri Basin. I would urge most careful consideration of these two activities by your committee. Dollar-wise, they are small in relation to the total program but they are so vital to proper development of the other phases that they should be activated at the earliest possible date.

DEPARTMENT OF AGRICULTURE,
RUSH COUNTY SOIL CONSERVATION DISTRICT,
La Crosse, Kans., October 30, 1951.

To the House Agriculture Subcommittee on Flood Control and Soil Conservation:

The board of supervisors of the Rush County soil-conservation district take this opportunity to present a statement of their views on the needs of soil conservation in our district and that of downstream flood-control dams.

Rush County has an area of approximately 460,160 acres, of which approximately 2,914 acres are taken up by creeks, streams, and other drainage features. Most of the upland soils of the county are moderately heavy, causing a considerable runoff of water even on the more gentle slopes. The average rainfall during years records have been kept is 21 inches. Seventy-six percent of this moisture falls in a 6-month period during the growing season. It is usually during this period that most of the damage to our soil has been caused by water erosion.

Agriculture is the basic industry of the county. Therefore, the treatment and special care of our soil must be considered as our most important problem. To date we have approximately 10 percent of our land terraced, and approximately 300 acres seeded to grass. We need to plant about 20,000 acres of land to grass and have a long ways to go to have the rest of our land terraced. There are several factors that have slowed down the work in our county. First, we do not have enough personnel to supervise this work. Second, we have to depend on contractors to do this work; but, since the incentive payment by the PMA is greater in the counties adjoining us to the east, the contractors have been by-passing us. We could probably overcome the second factor by getting the individual farmers interested in building their own terraces, ponds, etc., providing the SCS could provide us with enough personnel to supervise their work.

It is our belief that when we are being called on to produce to the maximum, and are being heavily taxed, it would be to our Nation's best interest to try to use most effective methods to save its soil and prevent floods. This method, as we see it, would be the upstream or watershed treatment instead of the multi-million-dollar dams that the Army engineers insist on building. The watershed treatment will help to control the floods all the way down the valley, and will slow down the silting of the large reservoirs that have been built. It will store water on cheaper land. It will also help to recharge the underground-water supply which is so vital in the valleys where irrigation projects are under way. The cost of protecting an acre of land in our county through Government-incentive payments figures to about $2.31 per acre, while that of building a 1,000 yard dam which will hold about 5 acre-feet will cost about $24 per acre-foot. We feel that this is cheaper and will be more effective than the downstream dams and levees. We do know that, if the greatest amount of water is not held where it falls, the silt that this water will carry with it will be deposited in the reservoirs of the large dams and in time these dams will lose their effectiveness for flood control.

We read in the newspapers and magazines of the dollars' worth of damage done by the floods in the valleys and towns, but very seldom do we see where the biggest damage has been done, and that is on the upland where the soil is lost. If we think that we can afford to be negligent with our soil, then our Nation is not far from becoming poor.

OSWALD SCHNEIDER, *Supervisor.*
M. R. AUSTERMILLER, *Supervisor.*
ARNOLD GREENWALD, *Supervisor.*
W. L. BOULEY, *Supervisor.*
E. W. FRIKEN, *Supervisor.*

WALLACE COUNTY SOIL CONSERVATION DISTRICT,
Sharon Springs, Kans., October 29, 1951.

To Whom It May Concern:

We, the supervisors of the Wallace County soil-conservation district, believe that the majority of the members of our district feel that a more extensive program for controlling precipitation upon the upper regions of the watershed is needed. More financial assistance, materials, and manpower are needed for laying out and constructing dams, diversions, and terraces on all suitable areas. All land unfit for cultivation should be terraced and reseeded to grass. Pastureland should either be terraced or contour-furrowed.

The basic purpose of such a program should be to hold as much of the precipitation as possible where it falls, to control the runoff so that it is not erosive, and to reduce sedimentation in our main-stream channels.

E. L. DEMINT.
HARLON BOGENHAGEN.
GERALD W. CUMMINGS.
HAROLD FRASIER.
R. B. RIGOR.

STATEMENT OF RAY BECKMAN, HOXIE, KANS.

Whereas flood control is a current and urgent problem of all the people and, in particular, the farmers of this country; and

Whereas full use of all means of control now provided should be used and full value obtained; and

Whereas this Government's agricultural conservation program provides for technical assistance and financial assistance in the matter of water and soil control to any farm in the Nation; and

Whereas any program on the farms can progress and continue only with the participation of the farmers themselves: Therefore, let it be recommended—

1. That the county and community committees of the Government's agricultural conservation program be directed to obtain help of others, such as county road authorities, in coordinating the flood-control program.[1]

2. That on farms, dams, detention terraces, and seeling of steep slopes to grass be encouraged to be established by the farmer, but that at least 90 percent of all the funds of the Government for soil- and water-conservation use be restricted to payment for share-the-cost of construction.[2]

3. That the county committees of the agricultural conservation program schedule all requests of all farmers for flood or conservation assistance and account for all expenditures, distinguishing technical from construction, and that employment of the Government-furnished technical assistance be by and under the direction of the county committees; and, in order that work proceed as scheduled through requests of the farmers, the committees be permitted temporary employees as necessary. That also, under the conservation materials and services plan, direct the county committees to license and bond private contractors to furnish technical assistance and certification of completion of the project to the extent and requirements of the Agricultural Conservation Program Handbook for a surcharge of 10 percent of the construction cost of the project.[3]

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[1] An instance would be wherein a dam could be used in lieu of a culvert or in connection with a culvert, with additional cost furnished to the county. Such a measure, as shown by actual operation this year in some draws, would eliminate 100 percent of the water from most draws from entering the main stream and would impound the water on untillable land as a rule. The cost would be saved in road repairs in 20 years or less.

[2] The cost to the Government for technical assistance when salaries and overhead of the Soil Conservation Service and agricultural-conservation-program supervisors are combined exceeds construction costs of projects built. County committees now can use part of the agricultural-conservation-program funds to employ technical assistants as necessary; this fact is repeatedly ignored by the Soil Conservation Service when they continue to state that there is a lack of funds for technical assistance.

[3] One central source of help is needed, and a program of work should be so arranged that the work is done when the farm land is open to have it done. At present, with many contractors working extra cost, serious delay of work is occasioned, since the contractor must be delayed while the Government supervisor gets around to making the trip out to the project and certifying that the project is complete.

4. That it be farmers, through their duly elected county and community agricultural-conservation-program committees, who do the administering, employing, directing, and final authority in the county-wide aspects of promotion of all Federal efforts at flood and water control when applied to the farmer.[4]

PETITION OF SCOTT CITY CHAMBER OF COMMERCE, SCOTT CITY, KANS.

TO THE COMMITTEE ON AGRICULTURE,
House of Representatives, Congress of the United States:

I

Whereas real estate situate in Scott County, Kans., irrigated and highly developed farms have been inundated by flood waters of the White Woman River, and;

II

Whereas the situation is unique in that the White Woman River has no outlet and that farms once flooded remain inundated for months until such water is removed by seepage and evaporation, and;

III

Whereas we residents of Scott, Greeley, and Wichita Counties, State of Kansas, believe that the only means of preventing repetition of the most recent catastrophe is the location of dams and reservoirs along the meanderings of the White Woman River and its tributaries so that such water will prove a benefit and not a calamity to the presently inundated real estate, and;

IV

Whereas we feel that this specific assistance coupled with intensified soil conservation practices is the solution to this situation and the redemption of one of the most valuable areas per capita in the United States, and;

V

Whereas it is desired to augment the information heretofore supplied this committee and at the same time express our approval of such project with our pledge of cooperation.

VI

Now therefore, we petition this honorable committee to take whatever steps are necessary to bring into being at the earliest possible moment a system of flood control along the White Woman River with dams at suitable locations its meanderings to prevent repetition of the most-recent calamity by flood and at the same time preserving the normal rainfall for recharging the underflow beneath the soil and the preservation of the surface.

Erwin Gruben, G. O. Whitson, Harvey C. Miller, Emery Bontrager, Bernice Bontrager, of Scott City, Kans.; Russell Drake, Lora Drake, John Dague, Grace Stark, of Shallow City, Kans.; Lorimer Teeter, Adolph Basgall, of Scott City, Kans.; Southwest Grain Co., of Shallow Water, Kans., by Adolf Basgall; Brainard L. Anderson, of Tribune, Kans.; Tobe R. Kaufman, of Scott City, Kans.; R. M. Kamp, Paul Ryan, Collingwood Gr. Co., by R. M. Kamp, manager; Mrs. Paul Ryan, Geo. P. Graham, Mrs. Geo. P. Graham, Mrs. J. E. Clinton, J. W. Chadwick, Mrs. J. W. Chadwick, Dale Thomas, Mrs. Dale Thomas, R. D. Been, Mrs. R. D. Been, Mrs. I. J. Thorp, Mrs. John Erskin, John Erskin, H. E. Trout, Mrs. H. E. Trout, Harold C. Trout, Mrs. Harold C. Trout, of Shallow Water, Kans.; Burnard Teeter, of Scott City, Kans.; Edith Dolsby, of Shallow Water, Kans.

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[4] A so-called bureaucrat is as unpopular with the farmer as with other people, and in line with the concepts of democracy must be the servant rather than the supervisor of the farmers.

Clifford W. Durrant, W. B. Guilie, of Scott City, Kans.; Lowell Whitson, Mrs. Lowell Whitson, Walter Dobrinski, Mrs. Lydia Dobrinski, Mrs. Doy Harp, Mrs. Jim Graham, James Graham, of Shallow Water, Kans.; Richard Deng, Otto Geeseka, Alice A. Geeseka, Charles B. Taylor, Carl F. Hockemeies, of Scott City, Kans.; Susan Taylor, Ralph J. Taylor, E. R. Patton, Mrs. E. R. Patton, Walter F. Jones, Jr., Harriet B. Jones, Anton Haupt, Dorothy Haupt, of Scott City, Kans.; A. L. Elrod, Mrs. A. L. Elrod, Wayne Bulkley, J. G. Dokly, I. J. Tharp, Sr., of Shallow Water, Kans.; Bob Weiderstein, Paul Tharp, Mrs. P. Tharp, Mrs. Bob Weiderstein, R. H. Teeter, Mrs. R. H. Teeter, S. D. Bontrager, Mrs. Sam Bontrager, Floyd L. Fairleigh, Harry L. Fairleigh, Mrs. Harry L. Fairleigh, of Scott City, Kans.

John Lang, Melchior Lang, Madge Lang, Orval Zink, Mrs. Orval Zink, Arthur Miller, Mrs. Arthur Miller, Charles Duff, Kathryn E. Duff, J. E. Hushaw, Elizabeth Hushaw, Spencer H. Hull, Mrs. Spencer Hull, Mrs. Mary Norman, Curtis A. Steele, Mrs. Curtis A. Steele, Mrs. Grace M. Starr, W. R. Proudfoot, Mrs. W. R. Proudfoot, Marion T. Dunant, G. E. Peters, of Scott City, Kans.; Calvin Murphy, Mrs. Calvin Murphy, Earl Frisk, Lela Grippin, Geo. L. Duff, Hazel M. Duff, of Shallow Water, Kans.; L. F. Roark, M. K. Armantrout, Theo. Boulware, Keith E. Hushaw, Mrs. Keith Hushaw, Joe A. Techlenburg, L. J. Loux, Ronald Beach, Mrs. Ronald Beach, of Scott City, Kans.; Mrs. Nellie Beach, of Garden City, Kans.

Lee Oldham, Otto Krenzel, Donald Krenzel, of Leoti, Kans.; George Gilmore, of Selkirk, Kans.; A. E. Anderson, of Scott, Kans.; T. J. Haislip, of Selkirk, Kans.; A. D. Elmore, Hugh L. Gray, of Leoti, Kans.; Harold E. Reynolds, Jr., Tribune, Kans.; J. A. Gaddis, C. S. Duficey, of Selkirk, Kans.; O. L. Oldham, of Leoti, Kans.; K. L. Oldham, of Scott City, Kans.; Herb J. Barr, of Leoti, Kans.; Willis Reimer, of Selkirk, Kans.; Kermit Snell, of Leoti, Kans.; Woodson Owen, A. C. Cox, Joe Strickle, Mrs. H. T. Rees, of Scott City, Kans.

SOIL CONSERVATION AND FLOOD CONTROL

WEDNESDAY, OCTOBER 31, 1951

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON SOIL CONSERVATION AND FLOOD
CONTROL OF THE COMMITTEE ON AGRICULTURE,
Topeka, Kans.

The subcommittee met at Topeka, Kans., Hon. W. R. Poage (chairman) presiding.

(Members of Congress present: Hon. Clifford R. Hope, Kansas; Hon. William S. Hill, Colorado; Hon. Harold O. Lovre, South Dakota; Hon. Albert M. Cole, Kansas; and Hon. Myron V. George, Kansas.

The CHAIRMAN. I am going to call this meeting to order and possibly I should say to those who are here assembled that we are here to consider a phase of the work of the Committee on Agriculture which involves the prevention or control of floods. I prefer to use the word "prevention" rather than the word "control" because it seems to me the proper approach to the problem of flood damage is to prevent the occurrence of floods insofar as humanly possible. I know there are those who claim you can prevent all floods. I never accepted that philosophy because I can go out here and see the valleys that have been cut by these rivers and I think there must have been floods a good many times before. Probably if we had all the flood-control and flood-prevention methods known to man, we still could not possibly prevent all floods. But we can prevent a large part of the damaging aspects of the floods, and one phase of its undoubtedly is in the proper control and use of our land and the upstream treatment, and that is the portion of the flood work over which the Agriculture Committee has jurisdiction.

We have no jurisdiction over the Army engineers. We have no jurisdiction over the Bureau of Reclamation. Under our system of government they have been established as separate agencies. Whether they should be combined is another problem and on which there is a diversity of opinion. Obviously most of the people with the Department of Agriculture probably feel they should absorb the other agency and I guess the other agency thinks they should absorb the activities of the Department of Agriculture. But we are faced with doing what we can with the tools that we have and one of those tools consists of soil conservation and the work it can do on upstream prevention of floods. This committee is not here simply to consider the Missouri Valley in its floods. We recognize the Missouri Valley as being an important part of the United States. It comprises one-sixth of the land area of the United States. It produces possibly one-fourth of the food in the United States, and we recognize that it is a vital part of the United

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States. But it is not all. Those of us who live south of the Red River, of course, which insist we too are part of the United States.

We are here to consider a program that should be applicable to all parts of our country and to determine just how we shall proceed with that program. The Department of Agriculture has had authority for some years under the Flood Control Act, which provided for this upstream work. The Congress never provided much money.

There are at the present time, I believe, 11 little basins in the United States on which this kind of work is being carried and only about $6 million appropriated. Obviously you cannot expect very much flood control $6 million spread over the United States. That is, you cannot expect to accomplish a great deal with that amount of money. So it would be unfair to blame the Department for failure of the program to have stopped all floods in the past. It is going to take a tremendous amount of money to make a program of this kind reach all over the United States, but possibly there are some sections that should be started before other sections, and this committee must make some determination and some recommendation to the Congress as to exactly what areas should be first treated and should receive priority, and it is more on that line that this committee comes to Topeka today, than to try and settle any disputes as to jurisdiction between any of the agencies of the Government. It is our business to try and determine whether projects that may be recommended for upstream treatment for agriculture treatment of your floods are of such priority as to deserve authorization at this time by the Congress, and it will be along that line that we will proceed today.

I want to introduce the members of the committee to the audience and then we will proceed. We have with us two of your own Congressmen, who are members of other important committees of the House and not members of the Agriculture Committee. We are delighted to have the Congressman who represents this district, Albert Cole. [Applause.] And the Congressman who represents the district south of here in eastern Kansas, Myron George. [Applause.] Then we have as members of the Agriculture Committee, which has the jurisdiction in this particular instance, Harold Lovre, from South Dakota. [Applause.] Bill Hill, from Colorado. He was born in Kansas. I never saw how he got that far West. Stand up Bill. [Applause.] Then I hope I do not have to introduce to a Kansas audience the former chairman of the Agriculture Committee, the man who has served more continuous unbroken years on that committee than any other member, and a man whom all the United States looks upon as an authority in the field of agriculture, and certainly one to whom the members of the Agriculture Committee all look to in leadership, your own Congressman from southwestern Kansas, Cliff Hope. [Applause.]

I want to ask Cliff to take over and preside at this meeting and call the witnesses and make such remarks and handle this meeting as he pleases, because I know there is nobody more familiar with the problems of agriculture than Cliff Hope.

Mr. HOPE. Mr. Chairman, ladies and gentlemen, I had hoped that Mr. Poage would go ahead and preside over this meeting. I would like to have had you see him in action. We think so much of him down in Washington and he has done such a great job as vice chairman of the Agriculture Committee of the House and as chairman of this subcommittee, that I think he should go ahead and preside over this meeting. It is very courteous and kind of him to ask me to preside and I appreciate that and maybe we will go along here and preside together because we are so much in agreement on this and other matters that I know we can act as a team. As I am probably more familiar with the names and organizations that are represented here, it might be all right for me to go ahead and call off the names. Let me make this announcement in the beginning: If you expect to or wish to testify and appear before the committee and have not given your name to Mr. Heimburger of the committee staff, I suggest that you do so as early as possible. He will be over there in the corner of the room and I suggest you see him and give him your name if you desire to be heard. We will hear everyone. If it should be necessary to limit the time in order to do it, we will have to do that. We had a larger list of names at Colby than we have here so far and as far as I know, everyone had all the time they wanted, and we hope that will be the case today. In case you have a prepared statement and wish to file that, or wish to make a short statement and file a more detailed statement, the committee will be glad to have you to do that. We want you to proceed in your own way in the matter.

We will start the hearing by calling on Mr. Gladwin E. Young, special representative of the Department of Agriculture, with offices at Lincoln, Nebr., and who is thoroughly familiar with the Missouri Basin program.

STATEMENT OF GLADWIN YOUNG, UNITED STATES DEPARTMENT OF AGRICULTURE FIELD COMMITTEE

Mr. YOUNG. The Honorable Mr. Hope and Mr. Poage and Members of the Congress, those of us who are so directly concerned with conservation and the use of land and water are very much encouraged by the interest shown by your committee. Those of us who live and work in the Missouri Basin must take into account what is going on in this river basin. The interrelationships of land and water that exist here undobutedly illustrate the kind of problems that exist in other basins. Mr. Hope pointed out that there are other river basins with the same similar problems that exist in the Missouri Basin. The Missouri Basin has a special program under way. Kansas is concerned with that program in its north half of the State and will soon be concerned with that kind of a program with the Arkansas, Red, and White, but we must take into account that the Nation has designated the Missouri River Basin as a special area for resource development and has authorized and is implementing a special pro-

gram for the basin. The Missouri Basin Interagency Committee, representing the voluntary efforts of the Federal Government and State governments, is using its influence to coordinate that program. It is using its influence to develop for the Missouri Basin a program that will make full and productive use of the land and water resources of the basin. Before commenting more directly on the phase of agreiulture in the proposed coordinated program for the Missouri River Basin, it might be useful to point out some of the characteristics of the basin that give rise to the need for a special program.

Mr. Steel will point to the map. The Missouri Basin is more than 1,300 miles long and 700 miles wide. It includes one-sixth of the land area of the United States. A fourth of the Nation's farm land lies in the basin. The river itself flows about 2,500 miles from its origin in Montana until it meets the Mississippi River. It contains 326 million acres of land in all or parts of 10 States involved in the Missouri Basin. There is Nebraska with all of its State lying within the basin; about 97 percent of South Dakota; 59 percent of North Dakota; 82 percent of Montana; 76 percent of Iowa; 29 percent of Colorado: one-half of Kansas; the western third of Iowa; northern part of Missouri.

The basin experiences extreme variations in weather. It straddles a transition zone from humid to semiarid climate as shown on the map there. I would like to point out again at the top of the basin the characteristics indicated in the normal climate. You will see some spots in the middle of the northern Great Plains, one representing the Black Hills of South Dakota, the other Big Horn Mountain, and the other the Continental Divide Mountains, in which the climates are humid, a high-rainfall area. The other enormous yellow area, semiarid, low-rainfall area. The pink on the map is still a little heavier rainfall than the arid area with somewhere around 12 to 14 inches of rainfall on the average. The pink area shows 24 to 26 inches as you go from east to west. The brown area would include part of Kansas, eastern Nebraska, western Iowa, with a rainfall of 24 to 36 inches. Running down into Missouri there is still a higher rainfall area of from 36 to 44 inches. That characteristic shows up again when we look at the average annual runoff of the water. Again, the high mountain areas, those blue areas, the national forests and high-mountain areas have a runoff of around 10 inches or more per acre on the average. The large yellow has an annual runoff of less than 1 inch of rain. The pink area has a runoff of from 1 to 3 or 5 inches, and the heavy runoff is on down as we come into the area in which we are located today.

Those are significant factors in regard to the management of our land in relationship to water. I would point out that one of the most critical involvements of agriculture stability is to be found in those weather belts which have an inadequate rainfall. The further extension of irrigation from impounded water gives promise of adding stability to agriculture along some of the valleys, some of those in that semiarid Great Plains area. More than 90 percent of the land, however, must be farmed with the weather. Therefore, if we are to reduce the extreme effects of drought, it is going to be necessary to extend the application of moisture-conservation measures in dry-land

farming and improve range management and livestock water supplies throughout the grazing areas. We must be as much concerned with drought control within the Missouri Basin as we are with flood control. That is something we in the lower areas overlook sometimes. The Missouri Basin program we are proposing deals not only with flood control as it affects water management problems but it concerns itself with a drought control which is a water-control problem in the light-rainfall areas.

Another characteristic of this map is the section that indicates the general physical characteristics in terms of topography. There is the long sloping area. Notice the hilly areas in the mountain areas, then the rolling plains, then the pink areas in this immediate area are rolling to hilly areas. There are no flat land areas. If you will recall the other map, your steep or rolling lands coincide with the areas of heavy rainfall, bringing together the problem of rapid runoff because of topography, together with rapid runoff because of heavy rainfall areas. The land characteristic of the Missouri Basin is shown on this other map. The heaviest cultivation of crops is shown in the blue area, South Dakota, eastern Nebraska, Iowa, eastern Kansas, and Missouri. These are some of the characteristics of the Missouri River Basin that have challenged the Nation to find a way to join with the people of the basin to develop its resources and make efficient use of them.

In the Flood Control Act of 1944, certain major features of Missouri Basin development were authorized. Since that date more than a billion dollars of Federal funds have been expended for planning and constructing certain of the engineering work having to do with the control and use of waters of the river and its tributaries.

The program authorized in the 1944 Flood Control Act for the Missouri Basin, popularly known as the Pick-Sloan plan, has been referred to as a comprehensive and coordinated program for the Missouri River Basin. As a matter of fact, it is not a comprehensive river basin program. It is comprehensive only with respect to orderly control and multiple use of water after the water has run off the watershed lands and has become a part of the flow of the rivers.

(Further statements were read by Mr. Young which are as follows:)

STATEMENT BY GLADWIN E. YOUNG, FIELD REPRESENTATIVE, OFFICE OF SECRETARY, CHAIRMAN OF THE USDA FIELD COMMITTEE FOR THE MISSOURI RIVER BASIN

Mr. Chairman, those of us who are so directly concerned with conservation and use of land and water are very much encouraged by the interest shown by your committee in this problem. Those of us who live and work in the Missouri Basin must take into account what is going on in this great river basin. The interrelationships of land and water that exist here undoubtedly illustrate the kind of problem in other river basins. Kansas is now concerned with the Missouri Basin now that the Arkansas, Red, and White Rivers are coming up.

The Nation has designated the Missouri River Basin as a special area for resource development and has authorized and is implementing a special program for the basin. The Missouri Basin Interagency Committee, representing the voluntary efforts of the Federal Government and State governments, is using its influence to coordinate that program. It is using its influence to develop for the Missouri Basin a program that will make full and productive use of the land and water resources of the basin.

Before commenting more directly on the place of agriculture in the proposed coordinated program for the Missouri River Basin, it might be useful to point out some of the characteristics of the basin that give rise to the need for a special program.

The Missouri Basin is more than 1,300 miles long and 700 miles wide. It includes one-sixth of the land area of the United States. One-fourth of the Nation's farm land lies in the basin. The Missouri River itself flows 2,460 miles from its headwaters in Montana to its confluence with the Mississippi River.

The Missouri Basin contains 326 million acres in all or parts of 10 States. The agricultural program, however, embraces 340 million acres. The additional 14 million acres are located in northern and eastern North Dakota where the use of Missouri water is contemplated in a series of extensive irrigation projects proposed under the Missouri Basin development program. The basin States with the percentage of the land area within the great watershed are as follows:

	Percent in basin		*Percent in basin*
Nebraska	100	Missouri	52
South Dakota	97	Kansas	50
Montana	82	Iowa	30
Wyoming	76	Colorado	29
North Dakota	59	Minnesota	2

CLIMATE

The basin experiences extreme variations in weather. It straddles a transition zone from humid to semiarid climate as shown on the accompanying map Normal Climate. In the dry lands of the West such as we have in this area right here, farmers and ranchers have had to plan against unpredictable droughts and at the same time protect their land against damage from torrential rains and floods.

We believe that drought and flood will continue to come to the Missouri Basin. Their intensity and recurrence is unpredictable. They cannot be prevented, but the disastrous effects of both drought and flood can be reduced.

As the map of the basin's normal climates indicates, the region is divided into five plainly discernible climatic belts.

The first belt is located in the extreme southeastern corner of the basin. Here most of the State of Missouri and the eastern counties of Kansas can count on 36 to 44 inches of rainfall. This is the climatic type classed as humid.

All of the Missouri Basin portion of Iowa, the southeastern counties of South Dakota, most of the Minnesota corner, the eastern strip of Nebraska, and the northeastern part of Kansas lie in the second belt. This climatic zone is shown on the map as moist subhumid. Within this area, average rainfall decreases from 36 to 24 inches from east to west.

The dry subhumid area of the eastern part of the Dakotas and central Nebraska and Kansas represents the third belt. This is a particularly hazardous area for farming because of the great extremes in rainfall and temperatures. In some years or series of years, abundant rainfall ranges far out into the area where less rainfall is ordinarily expected. But the converse is likewise true. The long-time average rainfall varies from 24 to 16 inches as you go from east to west.

The fourth climatic belt is the semiarid area of the northern Great Plains which contains much of the basin's great grazing area and a large part of the dry-land wheat farms. Rainfall runs as low as 12 to 14 inches on the average. Moisture is always a critical factor.

The fifth belt includes the higher elevations in the Black Hills of South Dakota and the Rocky Mountain area that forms the west border of the basin. Here much of the precipitation comes as snow and the climate varies from dry subhumid to humid in general accordance to the altitude.

WATER

The scarcity of water characterizes all but the lower part of the basin and the mountainous areas. The accompanying map, Average Annual Runoff, shows the areas that contribute most of the water flow in the streams and those areas that contribute very little.

Any plans for making the most productive use of the scarce water resource in the upper part of the basin must include consideration of management of the lands and forests on which the rain and snow fall.

Forest lands are important sources of water, and it is fortunate for the Great Plains that many of the rivers which cross them come from forested headwaters in the Rocky Mountains—the South and North Platte, the Yellowstone and other

upper tributaries to the Missouri River. These streams carry water for irrigation as well as for industrial and domestic use in areas far removed from the mountains.

One of the most critical problems of agricultural stability is to be found in the weather belts subject to inadequate rainfall. The further extension of irrigation from impounded water gives promise of adding stability to agriculture along some of the valleys. Upward of 90 percent of the land, however, must be farmed with the weather. Therefore, if we are to reduce the extreme effects of drought, it is going to be necessary to extend the application of moisture-conservation measures in dry-land farming and improve range management and livestock water supplies throughout the grazing areas. We must be as much concerned with drought control as flood control.

These are some of the characteristics of the Missouri River Basin that have challenged the Nation to find a way to join with the people of the basin to develop its resources and make efficient use of them.

In the Flood Control Act of 1944, certain major features of Missouri Basin development were authorized. Since that date, more than a billion dollars of Federal funds have been expended for planning and constructing certain of the engineering works having to do with control and use of waters of the river and its tributaries.

The program authorized in the 1944 Flood Control Act for the Missouri Basin, popularly known as the Pick-Sloan plan, has been referred to as a comprehensive and coordinated program for the Missouri River Basin. As a matter of fact, it is not a comprehensive river basin program. It is comprehensive only with respect to orderly control and multiple use of water after the water has run off the watershed lands and has become a part of the flow of the rivers.

In my opinion, the Nation's program for the Missouri Basin will continue to be out of balance in its planning and in its development until specific legislative provision is made for the agricultural and forestry watershed phases to be planned and carried out coordinately with the engineering phases.

The Department of Agriculture has since 1945 attempted to coordinate its work with the authorized construction phases of development. It has become more and more certain, however, that the acceleration of needed work on the watershed lands to keep pace with the rapidly expanding work under the Pick-Sloan part of the program could not be accomplished without specific authorization from Congress.

A request for authorization of such a program is contained in the Missouri River Basin Agricultural Program, House Document 373, Eighty-first Congress, first session.

The report itself has been drafted in a form that, when approved by the Congress, will become the basic authorization which would put the United States Department of Agriculture in position for the first time to work on a coordinate basis with other agencies on Missouri Basin development. It proposes an authorization for a 30-year program, the details of which are specifically set forth for authorization. The amounts and kinds of work for the entire basin are inventoried in definite physical terms as well as in dollar costs estimated to complete the work over a 30-year period. It is intended to make watershed development and conservation a definite and legally authorized part of the Nation's program for Missouri Basin development.

The program we are proposing is of necessity multiple purpose in nature because of the wide diversity of agriculture and agricultural values in the basin. It would supplement the effective job now being done by the Department of Agriculture and agricultural colleges in their cooperative work with farmers and ranchers. What we are proposing would not require new agencies in the Department of Agriculture. It would involve the work of the following agencies of the Department of Agriculture having direct responsibilities in carrying out the resources conservation and flood-control program of the Department: FS, PMA, SCS, Agricultural Extension, FHA, FCA, BAE, ARA, and REA. The authorization that would be provided by congressional approval of this program would be used to accelerate and adapt work in critical areas and watersheds and to undertake activities not now being carried out regularly under our national programs. The same degree of intensity of work would not be possible nor is it needed in all parts of the basin. We plan, therefore, to concentrate first on the most critical watersheds of the basin and to expand as rapidly as possible to other areas of the basin.

What that means in this immediate area of Kansas is that at such time as it would be possible to prepare a watershed program for critical waters, the

soil and water conservation specialists of the Department of Agriculture would work with the farmers and ranchers of these tributary areas in planning what should be done. In cooperation with soil conservation districts, drainage districts, irrigation districts, and similar organized groups, a specific plan for accelerating the job on each subwatershed would be worked out and carried out.

Let me point out again that specific plans for each watershed in the Missouri Basin have not been made. That job remains to be done. What we are proposing is that the program in the Missouri Basin shall take into account the fact that water falls first on the watershed lands before it becomes a part of the flow of the rivers. How these lands are used for crops, for grazing, and for forests is a dominant factor in developing and using the water resources of the Missouri Basin. The part that can and should be taken by the farmers and ranchers who manage the watershed lands should be included as an integral part of the program. In the Missouri River Basin agricultural program we are seeking a way to get this done.

Mr. YOUNG. Thank you, Mr. Chairman.

Mr. HOPE. Are there any questions on the part of the committee? If not, we thank you very much Mr. Young for your statement.

The next witness is Mr. Dwight Payton, of Overbrook, Kans., representing the Kansas-Nebraska Watershed Council. Following Mr. Payton I will call on Glen Stockwell, president of the Blue Valley Association.

STATEMENT OF DWIGHT PAYTON, REPRESENTING THE KANSAS-NEBRASKA WATERSHED NEWSPAPER COUNCIL

Mr. PAYTON. Gentlemen, I am speaking as representative of the Kansas-Nebraska Watershed Newspaper Council.

I might add that I am also a member of the board of directors of the Kansas Watershed Association and the Upper Marais des Cygnes Association.

If I am to hold within 5 minutes it will be necessary for me to speak bluntly, dispensing with official courtesy, so I ask your indulgence.

The people of Kansas are on record as favoring a sound and sensible, comprehensive flood-control program based on this formula: First survey the watersheds and compute the amount of rainfall that can be held and retarded below flood runoff, then where shown necessary, supplement watershed control with downstream surveys to provide needed additional structures. To proceed in any other manner can only result in great waste. To put in main-stream structures first makes as little sense as to have started our highway system years ago with construction of four-lane highways.

Kansas and the Nation need to face the fact that congressional appropriations can no longer be made wholesale. Taxation is beyond the point of confiscation, national budgets are "rooming up" with bankruptcy. Flood control is a need but it must not be approached on a pork-barrel basis, nor can we afford to risk our program to luxurious overlapping and false starts.

Our intent is to secure enabling legislation from the State legislature so that each watershed, or organized section thereof, can become a municipality for purpose of maintenance and control. For Statewide coordination we look to the State level, probably through our water resources department. This program, I submit, fits well into the framework of democracy. Other States, Nebraska, Iowa, Missouri, Oklahoma, and South Dakota, that I know of, are thinking along similar lines.

The benefits of this program are manifold: Official agency figures, which I will file with you, show that watershed treatment will impound more water than the multipurpose dams, at about one-third the cost. At the same time, watershed engineering takes no good land out of production whereas the big dams remove thousands of acres of our very best land. Our program gives flood protection to everyone. The Pick dams claim to partly protect the 25 percent loss area below. More than this, the watershed program will check erosion and conserve our precious topsoil, a benefit greater than flood control for the Nation at large. Watershed, to a degree, furnishes irrigation to everyone also, inasmuch as it greatly increases the on-farm water supply, steps up soil insoak and raises the water tables. For what it is worth as consideration, I could point out, too, that the watershed program affords recreational facilities for everyone. Actually recreational benefits for any program today are a phoney. Kansans need more recreation about like King Soloman needed more wives. The watershed program will result in increased farm evaluation and increased farm production, also, because it is based on the principle of better farming practices.

The superiority of this program over the Pick-Sloan dams is so great it seems ridiculous to even argue the point. Yet we in Kansas have learned to our disgust and anger that we have had to wage an all-out fight to even gain a fair hearing. We have seen a disgraceful exhibition of autocratic effort to bypass all democratic procedures in pushing through the huge multiple-purpose reservoirs of the Corps of Engineers. The record of this attempt in Kansas will be filed with you also.

The amount of agency and interagency intrigue and brazen effrontery in the flood-control picture has been a frightening revelation to me, and it has been this factor that brought me into the fight to prevent democracy's degradation in my home State. Our success so far is best evidenced by the fact that you are here today. I say to you that Kansas people are sick and tired of having the Corps of Engineers try to force-feed them with a big dose of Pick-Sloan pablum. These little Caesars of the slide-rule would carelessly despoil our State's greatest assets with a promise of flood control, even when there is evidence on record that while their dams may hold water, their promises won't. I will likewise file my authority for this statement.

We have been told that the various agencies are coordinating their efforts in the waterways program, but when we study into the matter we learn that the interagency committee is a device created by the corps as an escape from being placed under executive authority and that the whole history of waterways development has been a haphazard hodgepodge utterly lacking in any unified policy. This makes Kansans all the more anxious to assert the authority that is rightfully theirs in defining flood-control policy within their own State.

I know that the House of Representatives made a sincere effort to put through the Hoover Commission plan for reorganization for the agency dog-pile and I commend you gentlemen and strongly urge that the fight be made again. And you may be assured of our active support.

One other point I would mention—USDA has within its files the proof of superiority of the watershed program, taken from the Mill Creek section of the Washita project in Oklahoma and the Muskingum

Valley in Ohio, and other sources. Until recently the Soil Conservation Department has been unwilling to stand up in public. This has left an open field for the engineers to ridicule and misrepresent the program even to the extent of claiming it doesn't exist. As example of this, one of the corpsmen told a Kansas City meeting recently that those silly watershed people would and I quote, "build a terrace around every hill, plant crops on those hills and put a pond on top" and call it flood control. This was so offensive I issued a public challenge to the gentleman to repeat his words in open forum debate. His answer was entirely concerned with trying to impress me that he was ethical, plus a remark that he got all his information about watersheds from USDA bulletins. I would challenge him again to produce such a bulletin, but he is already on record as far as Kansas is concerned.

Your committee can do a great service to both Kansas and the Nation by insisting that USDA stand squarely and openly on the facts it has on file and support us in putting our program across. I believe our program is part and parcel of the program presented here today.

As citizens we demand that all Government bureaus act as servants for our rightful needs, not as masters who would control and dictate for selfish purposes of their own.

We in Kansas want a flood-control program that is both comprehensive and comprehendable.

Thank you.

Mr. HOPE. Do you have any questions?

Mr. POAGE. I would like to have you go into a matter that you went into just a little further because it is one I have sought in the past to get figures on without succeeding in getting much. That is, your statement about the agricultural program, that water might be impounded for about a third as much under the agriculture program. You did not call it the Army engineers' program, but I suppose that is what you meant.

Mr. PAYTON. That is right. This set of figures I have heard presented at two different meetings in the presence of all the agency groups and it has never been challenged at any time. It is taken from the official agency figures, as I said, and it is the United States Department of Agriculture and Corps of Engineers estimate on flood control for the little Washita and creek tributary of the Big Washita.

RELATIVE COSTS OF FLOOD PREVENTION

Before the Oklahoma City hearing of the interagency basin committee for the White, Red, and Arkansas Rivers, the engineers of the USDA and the Army Corps submitted estimates on flood control for the Little Washita, a creek tributary of the Big Washita. Here are the comparative figures:

	Army	USDA
Number of reservoirs	1	34
Drainage area, square miles	195	190
Flood storage, acre-feet	52,000	59,100
Recreation, permanent pool, acres	1,950	2,100
Flood, pool, do	3,650	5,100
Bottoms inundated, do	[1] 1,850	[1] 1,600
Bottoms protected, do	3,371	8,080
Cost, proposed plans, complete	$6,000,000	$1,983,000

[1] Only wasteland would be used for USDA program. The richest bottom lands would be inundated in the Army program.

Does that answer your question?

Mr. POAGE. Yes. I appreciate the figures. That is what I want. There is a part of this that I do not understand. If you look above there it shows that the pool is to be larger than the number of acres shown inundated. I just do not understand how that could be. I don't mean that I am criticizing or condemning these figures.

Mr. PAYTON. I am not sure I can clear that up. However, these are USDA figures and perhaps you can get that information from them.

Mr. POAGE. I appreciate your giving these to me because we have had difficulty getting these estimates.

Mr. HOPE. Is it your contention—I want to be sure I understand you correctly—is it your contention that a program like the Missouri Valley program can be used as a 100-percent substitute for the flood-control program known as the Pick-Sloan plan?

Mr. PAYTON. I don't exactly say that, Mr. Hope. I say that the program to make sense and logic has to start with a survey of the watersheds. When those figures are computed, then weigh it against the maximum rainfall figures, and if there is any supplementary structure needed beyond that point then proceed with your downstream surveys and planning. Certainly, I expect there will be areas where we need both, and I am calling for a comprehensive program, but I don't think it would make sense to put your big dam in first.

Mr. HOPE. I personally feel that a program such as you suggest would not be a complete and entire flood-control program, but I am in agreement with your viewpoint that we should start where you say we should start with the small stream treatment instead of starting the other way and going backward.

Mr. PAYTON. My original concept of this type of program is based some on the salt water surveys made at Lincoln, Nebr., and as you probably know, that is the upper water program coordinated with the downstream treatment. I don't claim a hundred percent watershed and I don't think anyone here this morning is going to do that, but I do say, let's make our start where it will serve Uncle Sam the best, save him much needed money, be careful we do not waste any money by putting the cart before the horse.

Mr. HOPE. Of course, I do not think any of us can say just what would finally have to be worked out in the way of flood-control structures, if we start in with the land. That is, there has never been anything done on which we could base experience. There are some small tributaries that have had treatment, one I think that has had full treatment, but I do not think we have had enough experience for anyone to draw definite conclusions. But I can say I will go along with you in your approach to the problem. I think a lot of these things are going to have to be developed on a trial-and-error basis.

Mr. PAYTON. That is correct.

Mr. LOVRE. Then, as I understand, your program is to implement the Pick-Sloan plan?

Mr. PAYTON. I don't consider it with the Pick-Sloan plan at all, necessarily. I merely say, let's do this sensibly, as good citizens, and

one bureau's plans fighting another bureau's plans is going to harm us, because we know what our State is, what our waterways are, and we have a lot of competent engineers in this State, and I think it is quite within our ability to handle the situation. These other agencies should work with us, rather than push us around and tell us what we are to do.

Mr. LOVRE. Then it is an integrated program that each has a particular phase of work to do?

Mr. PAYTON. Yes, but I like to think of it as a home plan, unified with other agencies, and to some degree, maximum degree kept under home supervision.

Mr. HOPE. And in reality there is no conflict of interests between the two?

Mr. PAYTON. Not if the procedure is followed that I mentioned.

(The following articles were submitted for the record by Mr. Payton:)

[From Topeka Daily Capital, October 27, 1951]

WATERSHED FORCES FORM STATE UNIT—GROUP TO INCORPORATE FOR FLOOD CONTROL; PLANS TOPEKA OFFICE

A State-wide organization to develop watershed associations in Kansas was formed Friday with the announced goal of uniting the State behind a comprehensive flood-control program.

A group headed by Dwight Payton, Overbrook publisher, approved articles of incorporation for the Kansas Watersheds Association.

A nine-member board of directors was selected to secure a State charter and expand the corporation to include representatives of farm, labor, and business organizations from all sections of Kansas.

STATE PURPOSE

The articles of incorporation set the association's purpose "to promote a maximum program of on-the-land water and soil conservation integrated and coordinated with proper water runoff-retarding and retention structures and other flood- and erosion-control measures."

Payton emphasized that the corporation will take positive action to promote formation of watershed associations on all of the major Kansas rivers and creeks. He said it would not "directly oppose the Pick-Sloan plan of the Army engineers."

THREE ALREADY FORMED

Watershed associations have been formed for the Blue River, Delaware River, and Upper Marais des Cygnes River in recent weeks. It was understood that at least six others were in the process of formation.

Payton said the corporation will establish a full-time office in Topeka to promote watershed districts and coordinate activity of existing districts.

"We've seen that the correct answer to flood control does not come from Washington," Peyton said. "The solution must come from the people concerned."

OPEN TO PROPERTY OWNERS

Membership in the corporation will be open to "any person residing or owning property within the State of Kansas." Membership dues will be set by the board of directors next week. The group will apply Monday at the office of secretary of State for articles of incorporation.

Original members of the board of directors are Payton, Edith Monfort, Reading; J. W. Farmer, Eureka; J. T. Heinen, Cawker City; William Avery, Wakefield; Glen Stockwell, Leonardville; Raymond Wegner, Ozawkie; Clif Stratton, Topeka; and State Senator W. H. White, Council Grove.

"There is no reason why Kansas should not lead the Nation in a grass-roots demand for complete flood-control methods," Payton said. He added that existing Federal plans "are not adequate and are not coordinated."

The organization's charter provides for it "to cooperate with other associations for the purpose of unifying and coordinating the work of other associations and to cooperate with municipal, county, State, and Federal agencies for the prompt, efficient, and economical organization and development of watershed projects and the enactment of enabling legislation."

The Delaware, Blue, and Marais des Cygnes watershed associations reported a "highly encouraging" response from residents within their drainage area.

Payton said the organization will work toward developing flood control to the point "where the Army engineers will be forced to come in and join us the same as they were forced to take part in the Salt-Wahoo project in Nebraska."

[From Overbrook Citizen, October 18, 1951]

IRVING NILES HEADS NEWLY INCORPORATED WATERSHED

Incorporation papers for the Upper Marais des Cygnes Watershed Association, naming the incorporators and the board of directors, were filed Friday with the secretary of state.

The directors' board is established on a rotation basis. Serving for 1 year are William Bitts, Melvern; Frank J. George, Lebo; G. G. Barkley, Burlingame; Walter Briggs, Reading; Frank Lewis, Admire; Frank Garrett, Overbrook; W. C. Neihart, Lyndon; B. F. Price, Reading; Rev. S. M. McCain, Burlingame.

Serving 2-year terms are J. D. Green, Melvern; Theodore Wehrle, Scranton; I. N. Niles, Lyndon; Ben Burns, Admire; W. F. Lindbloom, Admire; George E. Ramskill, Burlingame; Dwight Payton, Overbrook; Dr. G. M. Umberger, Harveyville.

The 3-year terms are held by Edward Phelon, Melvern; F. H. Masenthin, Vassar; R. H. Dubois, Burlingame; Fred Bloom, Osage City; Clifford A. Holmberg, Miller; Herbert T. Niles, Lebo; G. R. Evans, Lebo; Harry T. Coffman, Lyndon; R. O. Brown, Admire.

The board met in Osage City Saturday night to elect officers and plan a program. No. 1 job will be completing a 75 percent sign-up with the Soil Conservation Service within the area. Osage County, central in the area, already has a 50 percent sign-up.

Irving Niles, Lyndon, is president; Howard Schrader, Osage City, vice president; Rev. Sam McCain, Burlingame, secretary; and George Ramskill, Burlingame, treasurer.

The Upper Marais des Cygnes Association is leading the State in progress, and the directors are determined that it become the first in the State to reach completion. A membership drive will be conducted soon, and fees will go into the treasury to finance the promotional and educational campaign.

[From Burlingame Enterprise Chronicle, October 18, 1951]

WATERSHED ASSOCIATION GETS CHARTER; WILL SOLICIT MEMBERS

The Upper Marais des Cygnes Watershed Association completed incorporation and organization last week, and committees will be named in the near future to start work.

First big job, according to the pattern set at Lincoln, Nebr., is to push through a 75 percent sign-up for soil-conservation practices in the watershed educational programs will be held throughout the area to explain the benefits of the project and encourage all farmers who haven't signed up with SCS to do so immediately. Osage County already has a 50 percent sign-up, and there should be little difficulty in hitting the 75 percent mark. Figures are not available yet for Douglas, Wabaunsee, and Lyon areas, but they will be announced in the near future.

A near-home example of the watershed-treatment method was found this week on the farm of Harvey Booth, 2½ miles west of Baldwin on Highway No. 50N. Booth bought a worn-out acreage on creek land 4 years ago and undertook to restore the land. He followed the customary soil-conservation procedures and had planned to put in a sizable dam on the creek at the lower end of his farm. He sought advice and learned of the draw-down retention dam and changed his plans.

In a big draw east of the creek he has two sizable dams, one above the other, with terraced area above. Clear water runs into the creek from this draw now, and a worthless hillside has become one of the prettiest spots in the region, not to mention excellent pasture for cropland protected from wash. Booth has not allowed for much flood storage in his dams but reports that the June and July rains did not put the spillway overflow up to flood proportions. The Baldwin farmer-businessman has other retention reservoirs on his farm and yet others planned. His problems are as acute as will be found anywhere in this part of the State, and his farm serves as a laboratory for watershed treatment.

Farmers in the upper Marais des Cygnes area are urged to make their soil-conservation sign-up as soon as possible. When the needed number is secured, it will become possible to have a survey and move toward completion of the entire program.

Meanwhile, officers of the Upper Marais des Cygnes Watershed Association have been selected following receipt of a State charter last Saturday.

Meeting at Osage City, Saturday night, directors of the Association named Irving Niles of Lyndon as president and Howard Schrader of Osage City as vice president. Other officers include Rev. S. N. McCain, of Burlingame, secretary, and George E. Ramskill, treasurer.

Four permanent committees also were appointed with chairman as follows: Frank George, of Lebo, legislative; George E. Ramskill, finance; Robert Dubois, membership; Dwight Payton, of Overbrook, publicity.

[From Beloit Gazette, October 11, 1951]

WATERSHED DISTRICT ORGANIZED

A meeting of the Solomon Valley Flood Contol and Soil Conservation Association was held in Cawker City last night with a representative group of farmers and businessmen from six counties.

Leo Budke acted as chairman of the meeting, and Kenneth Remy, as secretary.

J. A. Hawkinson, of Bigelow, Kans., gave an interesting talk on controlling waters and saving soil through building of terraces, contour farming, and construction of detention.

Mr. Hawkinson told of the plans for such a district in the Blue Valley and of the successful operation of such districts in other watersheds. He told of the Washita district in Oklahoma, already completed, which successfully held back a 13-inch rainfall with no destuction from floods resulting. He also told of the Salt-Wahoo district in Nebraska near Lincoln.

In the forming of such a district it was explained that if 75 percent of the farms in district are signed up, the district may then apply to Congress for money to build the dams, which are placed according to survey in creeks, draws, and ravines in the hills; the dams are so constructed as to let the water recede slowly after rains so that floods will not result but water will run out of the reservoirs quickly enough not to damage grassland. Other districts in Kansas have been formed and are making application to Congress for money to start construction.

Mr. Hawkinson, who is a former State representative from Pottawatomie County, is a forceful speaker and dwelt at length upon the fallacies of the Pick-Sloan plan as a means of complete protection. He used the Kanapolis Reservoir as an example of what can happen below these large dams when the reservoir becomes full. Continuous flooding of Salina resulted for several days as engineers released waters in great quantities to lower the level of the reservoir.

Mrs. Edith Monfort, secretary of the Kansas Conservation and Flood Control Association, gave a nice talk, and Wilfrid Johnson, county commissioner of Pottawatomie County, gave a short talk on loss of taxable lands suffered in counties where large reservoirs are located.

A resolutions committee was appointed. They were Dr. J. R. Brown, Cawker City; Carl Thiessen, Solomon Rapids; L. G. Jennings, Lebanon; A. H. Hickman, Kirwin; and Lee Smith, Downs.

The committee on resolutions asked that a Solomon Valley watershed be formed and named members from various counties to serve on the organization committee.

[From Marysville Telegraph, October 4, 1951]

FORM BLUE VALLEYS WATERSHED ASSOCIATION—REPRESENTATIVES FROM SEVEN COUNTIES GIVE GREEN LIGHT AT RANDOLPH, MONDAY—DWIGHT PAYTON, OVERBROOK, KANS., PUBLISHER, THE FEATURED SPEAKER IN ROUSING TALK

It wasn't curiosity or anticipation of entertainment which brought a crowd estimated at 800 persons, representing seven Kansas counties, to the meeting called by the Blue Valley Study Association for problems of the entire Blue Rivers watersheds in the State of Kansas. These folks were there with one purpose; namely, to effect an organization for effective soil and water conservation on the area and also to oppose, to the last ditch, the construction of that destructive dream of the Army engineers, Tuttle Creek Dam.

Present in the big crowd were farmers, landowners, and businessmen from Riley, Marshall, Nemaha, Pottawatomie, Washington, Clay, and Republic Counties. It is these seven counties of the State in which parts of, or in some cases almost the entire county, lies in the area draining into either the Big or Little Blue Rivers. These folks all have the same desire: they want to preserve their land and stop the water where it falls, at its source

The program opened under the direction of Neil Pfuetze, of Randolph, who introduced Agricultural Engineer Earl Palmer, of Topeka, who, by using models of an actual watershed near Salina, showed the results obtained in 2 years by a comprehensive small watershed treatment on highly eroded and marginal land, together with the benefits to the farms and the solving of county problems due to the lessening of runoff.

L. R. Quinlan, of the horticulture department of Kansas State, then presented a series of beautiful colored slides of pictures taken by him in the Blue Valley near and above Manhattan. Featured were landscapes, winter and summer scenes, many of the river, and ending with a series of native wildflowers of Kansas as found along the Blue.

Glen D. Stockwell, president of the Blue Valley Study Association, then introduced the speaker of the evening, Dwight Payton, publisher of the Overbrook Citizen and an ardent proponent of watershed control of floods as opposed to MVA or the Pick-Sloan plan. He told in an interesting fashion of the watershed plan, criticized the Army engineers for trying to shape rather than to carry out public policy. The speech was emphatic, constructive, and well delivered and put the crowd in the proper frame of mind for the following speaker.

Richard Rogers, Manhattan attorney, then read the articles of incorporation for the proposed nonprofit organization and explained their meaning. He also referred to petitions to be sent to the Congress requesting aid on the plan. Following this explanation, Byron Guise, Marysville publisher, moved that the meeting accept the proposal to incorporate. "For 12 long years we have been trying to improve the Blue Valley," and Guise, "and we feel that we have come to the place to incorporate. Let's still leave the power with the people, where it belongs." The proposal was seconded by Bernhardt Roepke, Washington County, who also stressed the need for the organization. The vote to accept was practically unanimous.

In remarks made later J. A. Hawkinson said, "After 13 years of strife * * * we are more firm than ever that Pick shall not build the big dam." He also said that the watershed plan "should have been started 25 years ago." He cited the congressional allocations for the Delaware and of Snipe Creek, near Frankfort, in Marshall County, as examples of the plan in action. He then asked for signers on the petitions to Congress that the Soil Conservation Service have adequate funds for their work.

The committee appointed to work out the final details of the articles of incorporation and the bylaws of the organization were named by Stockwell. They are Raymond Drechour, farmer, Clay Center; Walter Bell, banker, Randolph; Bernhardt Roepke, farmer, Barnes; Fred Prell, farmer, Marysville; Wilfred Johnson, Jr., farmer, Garrison; Glenn Stockwell, farmer, Randolph; Ed Kulp, banker,

Haddam; Richard Rogers, attorney, Manhattan; Byron Guise, publisher, Marysville; and Joe Brown, attorney, Washington.

Following the meeting those present signed the petitions and some 26 men signed the articles of incorporation of the Blue Rivers Watershed Association of Kansas. All that remains now for the organization is the application for charter of the secretary of State and the filing with the county clerk of Riley County.

A delegation will also go immediately to Washington, where they will present the petitions. They also have an appointment with Chairman Cannon, of Missouri, head of the conference committee of the House on the controversial $5,000,000 Senate appropriation for Tuttle Creek Dam and other items of flood control. This meeting, in the Representative's office, will allow the delegation to present their case without bias and without the pressure found in the hearing in Washington last July.

[From Salina Journal, August 14, 1951]

GYPSUM VALLEY FLOOD CONTROL GROUP FORMED

GYPSUM.—Flood control for the Gypsum Valley watershed moved a step nearer reality Monday night.

A resolution calling for an organization to be known as the Gypsum Valley flood and soil conservation project was adopted unanimously by the 100 farmers and businessmen attending the special meeting discussing flood control.

Specific purpose of the group is to secure aid in harnessing Gypsum Creek from its origin at Canton to where it empties into the Smoky Hill River 12 miles north of Gypsum. Canton is 22 miles south of the city limits.

The group proposed that all people living in the watershed area be included in the program to be divided into three districts. It will be governed by a 15-man board with each district electing 5 men to its board of directors. The three districts are the areas on Gypsum Creek south to Canton, the city itself, and the 12 miles of farms bordering the creek north of the city.

Five men were elected to represent the city in securing Federal assistance. A meeting to elect delegates in the north part of the valley was set for 8 p. m. Thursday in the Kipp School house. No meeting date was set for residents living in the southern district. But a spokesman for the group indicated all officers would be elected by the end of the week.

Representatives from Gypsum are Tom Sellards, Ralph Kuhn, George Frisbie, Vernon Stevens, and Arthur Pierson.

The board of directors was granted the authority to—

1. Conduct promotion programs including survey of past flood damages.
2. Solicit and administer all promotion funds.
3. Call meetings of the organization necessary to the project welfare.
4. Recruit public assistance.
5. Represent the organization in full authority in planning with Army engineers and Government agencies.

It is the responsibility of the board to see the project started at the earliest possible date following election of all officers.

Gypsum's mayor, Ralph Kuhn, said the Kansas City office of the Army engineers collected data in 1949 pertaining to the watershed. For the 11-year period up to 1949 Gypsum Creek left its banks an average of three times annually Kuhn said.

He explained as soon as the organization was formed, the engineers would examine their 1949 data and make recommendations for flood control here. Then it will be up to the people in this area to determine the method they wish to employ.

Kuhn pointed out that the 1949 survey proposed detention dams be located on ravines and tributaries of Gypsum Creek from Canton to the Smoky Hill River. Cost and the number of earthen dams to be constructed was unknown. He added this proposal may be one of the three methods the Army has in mind for the project.

These earthen dams would probably be the best choice in controlling the 300,000 acres that drain into Gypsum Creek, he said.

An estimated 250 families are to be included in the newly-formed organization.

[From Hiawatha Daily World, July 7, 1951]

PLANS UNDER WAY TO DEVELOP DELAWARE RIVER'S WATERSHED

Two citizens from the south paid a timely visit at the World office Friday afternoon, timely in that both men are interested in promoting a project aimed at controlling floods in the Delaware River Basin to the south, a basin that was expected to dump another load of high water into Perry Saturday morning. The two men, Claude Brey and Walter Richter, both of Okawkie, are the president and vice president, respectively, of the recently formed Delaware River Basin association, a group whose plans include approximately the southwest one-third of Brown County.

On page 2 of this issue of the World will be found a map depicting the area involved in a large-scale plan for the intensive use of soil-conservation practices coupled with small detention dams for a combination of flood control and conservation of both moisture and priceless topsoil. It will be noted that Sabetha and Fairview lie in the northernmost limits of the drainage area while Powhattan, Mercier, Horton, Baker, Willis, and Everest are included in the watershed.

Along with many who have made a serious study of the problems created by uncontrolled water runoff, both Mr. Brey and Mr. Richter contend that massive spectacular dams, backing up huge reservoirs of water on a permanent basis over vast acreages of the richest farm land, do not spell the answer to the problem; not by any means. They argue, with considerable logic, that impounding water at the foot of a watershed is very similar to the old custom of putting the cart before the you-know.

The correct spot at which to attack this condition, the men went on to say, is the spot at which the raindrop or the snowflake first strikes the earth. Farmers are learning more and more about this relatively new science through the cooperation of the Government's conservation service and many are coming to believe that complete application of these practices, plus a series of small dams to hold the water back for short periods only will work to save the soil, retain moisture to build up the soil's reserve supply, prevent serious floods in the future and, most of all, retain thousands of valuable acres in production.

It will be noted by referring to the page 2 map that the area is divided into numerous subdivisions by shaded lines. President Brey said Friday that it is planned to organize each of these districts as an individual unit with chairmen and committees for action within its limits. The general association, he said, will serve to coordinate the activities of all of the component parts.

With this in mind, three meetings have been announced which all interested persons in the area in question are invited to attend. The first is to be at Valley Falls on July 17, the second the following night at Horton, and the third at Holton on July 19. All meetings will go into session at 8 p. m. at locations which will be announced later. Numerous speakers of national repute have signified their intention of attending and the entire plan will be explained in detail by Raymond Wagner, president of the Kansas Soil Conservation and Flood Control Association.

President Brey concluded his remarks by pointing out that in the matter of the vast billion-dollar dams which Army engineers have been advocating as a general rule the fellow below the dam is in favor of its construction. Right now, he noted ,the folks at Perry are screaming for the immediate construction of the Perry Reservoir, a project which would back the Delaware up over thousands and thousands of acres of good bottom land, but would serve to protect Perry and to heck with the folks on up the stream.

On the other hand, the president stated, the fellow above the dam is more than a little interested in keeping his farm and the improvements he has placed upon it. He has a natural affection for the place of his birth and the graves of his ancestors. He definitely doesn't want the dam.

Exponents of the mighty dams are loud in proclaiming that conservation and little water barriers will not do the job and that the great artificial lakes must go in at once. Mr. Brey, along with a flock of others, comes back with the reply, "How do we know this won't work until we've tried it?"

Everyone will concede, he said Friday, that conservation will help, and help a lot. It will also be conceded that detention dams will help, and help a lot. Why not, he demanded, try these first? They are relatively much less expensive and they keep needed land in production. Later, when all avenues of this approach have been explored and everything possible has been done, will be the time to evaluate the situation.

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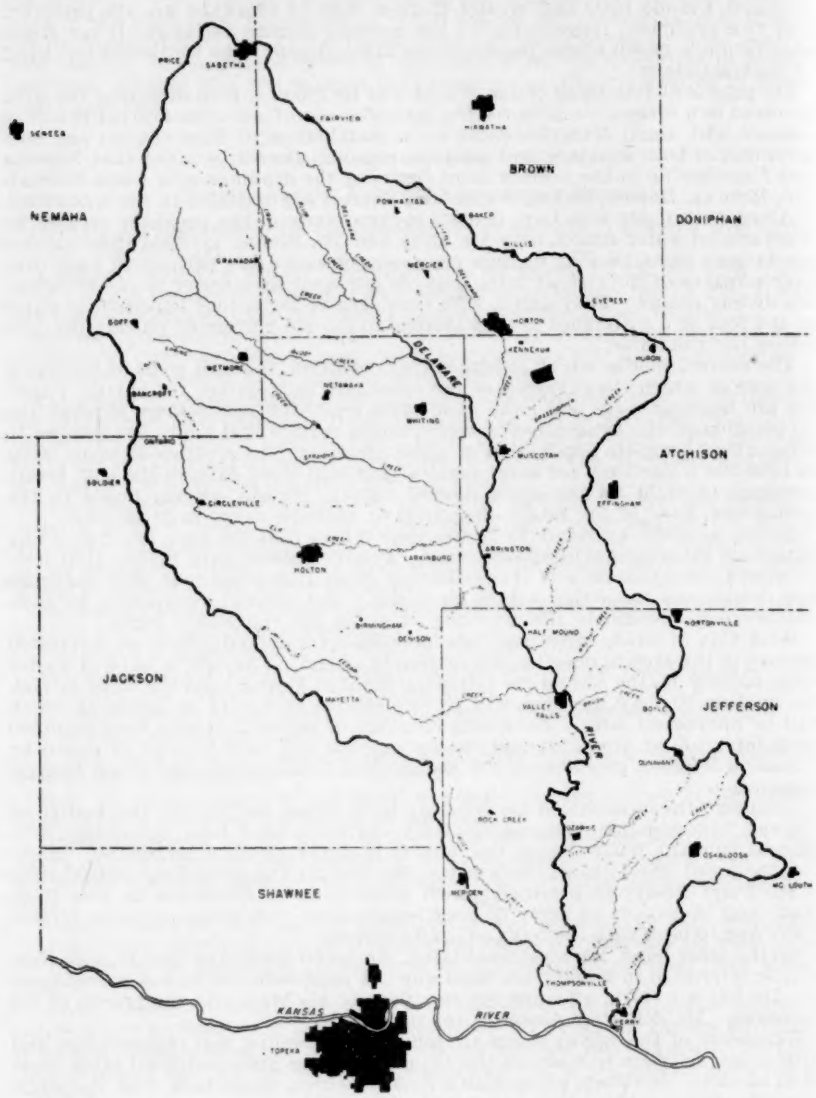
If the goal has not been reached then, a point which Mr. Brey is not prepared to concede, and dams are necessary for permanent impounding of water, they will certainly not have to be nearly so large or nearly so expensive. And more of the good State of Kansas will remain on the surface.

DELAWARE RIVER WATERSHED



[From Valley Falls Vindicator, May 31, 1951]

PLANS UNDER WAY FOR GREATER WATER CONTROL

The annual meeting of the Delaware River Basin Citizens Association was held at the Ozawkie High School auditorium, Monday evening, May 21, with satisfactory delegations from each of the five counties of the Delaware River Basin in attendance, namely Jefferson, Jackson, Atchison, Nemaha, and Brown. A very good attendance from outlying places showed much interest from other areas in the soil conservation development program planned by the Delaware River Basin Citizens Association.

The officers of the association gave favorable report of progress at home and also on the progress of special resolution before the work committee of the House of Representatives in regard to a special joint study of the Delaware River watershed by the Cops of Army Engineers, Soil Conservation Service and Reclamation Department of the Department of the Interior.

Election of officers of the association was held, Claude Brey being reelected as president. Raymond Wegner, who has been serving as vice president and who was recently elected president of the Kansas Soil Conservation and Flood Control Association, declined nomination to serve on the board because of the duties of the State organization, and Walter Richter was chosen in his stead as vice president. Mr. Glenn Lehman, who has served as secretary of the association, recently moved to Missouri, and Mr. Lloyd Barker, of Valley Falls, was elected as secretary-treasurer of the organization.

Raymond Wegner, gave detailed outline of the proposed Delaware River Watershed Association, plans of organization to cover the entire watershed area, the purpose of the new organization and outline of proposed bylaws and notice of incorporation. The body approved the outline suggested and instructed the board to proceed.

Many distinguished guests were at the meeting from a wide area of Kansas and many of them responded with favorable comments on the progress of the Delaware River Basin Citizens Association in their attempt to control water run-off and prevention of flood damage. Among the guests attending were: John Miller, agricultural director, Topeka Chamber of Commerce; R. V. Smrha, representative of Division Water Resources of Kansas; Paul W. Griffith, Kansas State College, Manhattan, Kans.; Eddie Meisluger, Corps Army Engineers, Kansas City, Mo.; H. S. Henrichs, Kansas Power & Light Co., Topeka; Wes Seyler, W. I. B. W., Topeka; Lewis Dickensheets, W. I. B. W., Topeka; Dick Nicholas, representing State board of agriculture; Emil W. Heck, of Lawrence; Mrs. Rodench Turnbull, of the Weekly Kansas City Star, of Kansas City; C. E. Crews, district supervisor, northeastern district of Kansas Soil Conservation Service; Edith Monfort, secretary of the Kansas Soil Conservation and Flood Control Association, and who was accompanied by a large delegation of associate workers from Osage and Coffey Counties. A number of other interested persons registered as from Holton, Hiawatha, Soldier, Baileyville, Muscotah, Arrington, Meriden, Valley Falls, Vassar, Horton, Reading, Lyndon, Seneca, Quenemo, Overbrook, Lebo, and surrounding local places.—Claude Brey, president, Delaware River Basin Citizens Association.

Mr. HOPE. Thank you very much. Mr. Glenn D. Stockwell, Blue River Watershed Association.

STATEMENT OF GLENN D. STOCKWELL, SR., BLUE RIVER WATERSHED ASSOCIATION

Mr. STOCKWELL. Mr. Chairman, members of the committee. I am a farmer here representing the Blue Valley Study Association and also director of the Blue River Watershed Association, that is primarily interested in a watershed development plan, as explained here by Mr. Young this morning, and part of my remarks are to show that farmers, the ones that are going to be involved in a watershed program are interested in and are willing to do their share.

I have here a table showing the number of applications on file with each county soil conservation district in Kansas, the number of acres

of land represented by these applications, the number of farm plans prepared and signed, together with the acres of land represented by these prepared plans.

Summarizing these figures, we find that on June 30, 1951, there were in the State of Kansas approximately 10,000 applications for soil-conservation surveys. This represents approximately 4,000,000 acres of land, where the farmers want to start the soil-conservation practices. There were approximately 38,000 plans completed and signed, representing over 11,000,000 acres of land. In addition there were 3,000 plans representing 8,100,000, acres that were completely treated according to plan. On September 30, 1951, there were about 11,000 plans on file awaiting action and over 39,000 plans completed and signed. Comparing this with June 30, 1950, we find an increase of 1,200 in the backlog of applications on file, although 6,344 plans had been completed and signed during this period.

Seven counties are affected by the Blue River watershed. I would like to submit the following information about the Marshall County soil-conversation district which lies wholly within the Blue River Basin.

1. There are 561,662 acres of farm land in Marshall County.

2. To date, the district has received 1,626 applications, covering 347,175 acres.

3. To date, 1,286 conservation plans have been written. These conservation plans cover 296,122 acres.

4. There are approximately 2,750 farms in Marshall County. Sixty percent of the farms in Marshall County are covered by soil-conservation applications or plans.

These figures show that the farmers of Kansas are keenly interested in soil conservation but are held back because of the lack of trained personnel in the local Soil Conservation Service. The preparation of a soil-conservation plan for a farm calls for highly skilled technical knowledge. Land capabilities, soil types, topography, and other factors must be considered. Here are 9,829 Kansas farmers wanting to start soil conservation on their farms but are being delayed 1½ to 2 years because of lack of personnel in the Soil Conseravtion field offices. Many become discouraged and others do not file an application because of this delay. On top of this backlog of unworked applications, many local Soil Conservation personnel are now engaged in the rehabilitation work on the flood areas. This is vital work if we are to restore the flooded areas to production next season. But it means that soil conservation must wait.

My organization feels that there is need for a supplementary appropriation for the Soil Conservation Service in order to provide the personnel necessary to handle the increased demand for soil conservation. The farmers are willing and ready to start the necessary soil-conservation measures if they can secure the help of trained technicians from the local soil-conservation districts.

I pointed out a moment ago that many of the personnel of the local Soil Conservation offices are engaged in rehabilitation work. They are overseeing the removal of silt and mud from creeks and river channels, and debris from fields. Silt that represents the life of our

country. Silt, that could have been retained on our upland farms through a proper soil-conservation and watershed-engineering program. We know that the soil is the greatest reservoir we posses. By proper land use, we can increase the capacity of that reservoir. With terraces and other structures, we can slow down the runoff and lead it from the land with no erosive action. This is water and soil conservation.

When the excess water leaves the field and enters into a ditch or gully, it has entered into the flood stream. The best place to control it is in these ditches and gullies before it has gained sufficient volume and velocity to do damage. Hold it there with retarding reservoirs and allow it to drain out slowly. Provide adequate floodways and channels below to handle the discharge from the outlets. This is watershed engineering; flood control added to conservation.

After the 1951 flood in Kansas, the Soil Conservation Service made a preliminary survey of agricultural damage along the tributary streams where the presently authorized flood-control program would not afford protection. This survey revealed an agricultural property and land damage of $101,520,000. An estimated damage occurred to existing reservoirs by siltation of $4,690,000, and a siltation damage of $2,140,000 would have occurred in presently authorized and partially completed reservoirs if they had been in operation at that time.

It is estimated that a watershed program for water-flow retardation and soil-erosion prevention, if it had been installed at the time of this flood, would have brought about a $38,990,000 reduction in the total damage to agriculture and land. The reservoir damage would have been reduced $2,660,000.

In addition to the damage done along the tributaries, there was damage in excess of $310,000,000 to upland farms from loss of fertile topsoil and from damage to crops. Most of this damage would have been prevented by a complete program of proper land-use and land-treatment measures. In other areas under similar conditions the damage has been reduced up to 90 percent by these measures.

The July flood was a freak flood with unusually high intensity and prolonged rainfall. This survey shows that the damage on the tributaries would have been greatly reduced by a complete watershed program.

Since the Geological Survey Circular 151 shows that the areas of heavy rainfall were principally below the presently authorized flood-control-program structures, we feel that the situation calls for a study of the entire field of water and soil management and the formulation of a realistic and feasible program that will give protection over the entire watershed.

Our group feels that a survey commission, as recommended by the conference report on civil-functions bill 4386, should be established to conduct a study of this area. The Blue River watershed lies in the center of the Missouri Basin. The topography, rainfall, and other features are typical. Before building a huge dam at the mouth that will destroy 53,000 acres of rich productive land, we should initiate a complete coordinated watershed program that could be used as a guide for the entire Missouri Basin.

Work of the soil-conservation districts of Kansas

County or district	Number of applications on file	Acres in applications on file	Number of plans prepared and signed	Acres in plans prepared and signed
Allen	208	32,942	1,052	181,324
Anderson	105	21,002	544	126,400
Atchinson	72	14,013	723	133,560
Barber	144	148,934	73	39,767
Barton	41	7,082	307	89,364
Bourbon	48	13,115	538	123,740
Brown	188	34,428	95	170,825
Butler	80	22,352	475	149,388
Chase	5	4,110	272	123,166
Chautauqua	32	10,204	16	4,026
Cherokee	21	5,780	471	37,059
Cheyenne	179	146,970	20	17,656
Clark	31	111,024	224	237,030
Clay	117	29,743	301	68,268
Cloud	83	17,777	471	97,924
Coffey	113	20,212	1,246	265,182
Comanche	51	61,005	74	78,878
Cowley	137	48,320	396	122,236
Crawford	73	11,193	564	113,751
Decatur	199	7,600	350	176,749
Dickinson	210	69,835	314	75,289
Doniphan	41	6,203	685	113,034
Douglas	58	11,484	654	121,811
Edwards	63	25,428	377	150,770
Elk	27	8,887	225	82,112
Ellis	58	25,544	304	161,965
Ellsworth	32	8,167	468	155,696
Finney	71	66,747	221	208,449
Ford	107	60,925	351	142,731
Franklin	48	8,715	869	153,930
Geary	56	16,202	526	189,336
Gove	129	130,168	70	54,543
Graham	98	46,550	469	202,581
Grant	25	10,972	149	81,078
Gray	32	22,400	160	94,991
Greeley	26	24,976	22	24,220
Greenwood	95	57,762	32	9,632
Hamilton	30	13,920	106	58,757
Harper	49	13,216	412	127,139
Harvey	42	6,418	433	85,734
Haskell	42	14,540	120	59,763
Hodgeman	89	67,420	43	30,230
Jackson	83	21,615	321	73,445
Jefferson	170	47,412	425	79,915
Jewell	279	60,884	831	207,857
Johnson	108	22,346	577	85,462
Kearny	34	38,916	75	59,834
Kingman	159	62,022	60	20,275
Kiowa	31	12,200	337	211,494
Labette	179	36,586	1,071	180,802
Lane	17	9,320	120	94,288
Leavenworth	105	18,375	213	39,098
Lincoln	135	67,881	106	44,823
Linn	104	21,337	198	54,221
Logan	88	130,272	83	55,388
Lyon	44	12,186	1,253	266,289
McPherson	84	30,423	487	95,383
Marion	196	46,957	287	74,147
Marshall	252	89,485	1,297	294,550
Meade	87	81,890	82	68,695
Miami	217	50,602	324	49,792
Mitchell	17	6,823	350	103,631
Montgomery	66	16,445	382	81,104
Morris	215	82,529	631	191,593
Morton	24	18,800	29	18,815
Nemaha	335	61,512	517	119,312
Neosho	120	22,595	852	142,973
Ness	24	8,840	538	295,864
Norton	256	107,629	355	125,608
Osage	163	28,030	1,156	234,132
Osborne	67	33,500	442	182,610
Ottawa	111	25,150	187	58,962
Pawnee	6	1,440	642	170,979
Phillips	334	100,392	396	127,127
Pottawatomie	68	20,400	424	144,657
Pratt	56	22,280	416	141,978
Rawlins	141	113,505	283	198,185
Reno	95	26,830	575	139,658
Republic	38	6,628	371	76,177

Work of the soil-conservation districts of Kansas—Continued

County or district	Number of applications on file	Acres in applications on file	Number of plans prepared and signed	Acres in plans prepared and signed
Rice	115	41,871	423	97,810
Riley	73	20,220	209	57,585
Rooks	148	66,724	199	75,814
Rush	25	11,071	310	102,466
Russell	67	37,015	225	110,795
Saline	125	31,250	489	125,478
Scott	27	19,370	162	147,584
Sedgwick	197	24,360	1,146	222,519
Seward	37	27,117	66	50,638
Sheridan	112	56,190	214	97,700
Sherman	38	36,208	195	169,753
Smith	160	57,823	125	44,505
Stafford	46	12,175	305	107,070
Stanton	50	47,580	12	7,141
Stevens	32	29,235	50	30,620
Sumner	218	93,592	880	184,349
Thomas	55	30,086	221	122,723
Trego	120	49,295	448	183,128
Wabaunsee	46	19,248	65	26,722
Wallace	27	17,510	5	6,620
Washington	117	31,977	166	44,901
Wichita	21	24,000	73	70,034
Wilson	78	21,918	930	208,160
Woodson	32	11,657	447	120,683
State total, June 30, 1951	9,829	3,866,216	40,180	11,806,453
Canceled plans			2,512	529,717
Active plans			37,668	11,350,135
Plans on maintenance [1]			3,206	812,863
Sept. 30, 1951	10,566		39,193	
State total, June 30, 1950	9,366	3,422,392	32,849	9,685,929
Increase of Sept. 30, 1951, over June 30, 1950	1,200		6,342	

[1] Farms completely treated according to plan.

We feel the estimations of the Army engineers is inadequate. They underestimate the siltation by a tremendous amount.

Mr. HOPE. When did you have the other serious flood in Topeka, a real one?

Mr. STOCKWELL. Well, 1903 is the record before this year.

Mr. HOPE. That is how many years ago?

Mr. STOCKWELL. Forty-nine years ago.

The civil engineers say that the studies in sedimentation are very inadequate, have been in the past. They take the fine sediment that is suspended in the water, take a sample of the water and calculate it, so many cubic feet; but, the sediment that rolls in the bottom, they cannot measure. They can only estimate how much sand and debris is on the bottom of the river as it rolls along. So, any sedimentation study is only an estimate.

Mr. HOPE. I would like to ask you the same question I asked Mr. Payton. Is it your belief and contention that a land-use and watershed-treatment approach would eliminate the need for large dams?

Mr. STOCKWELL. Not altogether. It depends upon the topography of the ground, the rainfall, and other factors. The study is not complete as to downstream benefits. I feel that the same amount of money

expended for a watershed program would give us as much benefit as the other, but it would be foolish to claim downhill benefit 200 or 300 miles below the watershed. As the reservoir system is too far from the land, they are no protection, and they are built above the areas of high rainfall. The record of high rainfall shows most of the rainfalls below the Pick-Sloan plan; so, I can't claim a benefit downstream.

Mr. HOPE. To get the maximum benefits under the program you propose, you are going on the assumption that there would be 100-percent cooperation on the part of the landowners?

Mr. STOCKWELL. That is right.

Mr. HOPE. Of course, it is a voluntary program, but you think that in the main you would have practically universal cooperation—do you?—in such a program on that part of the farmer?

Mr. STOCKWELL. Yes; I do. In observing the soil-conservation work, I started 25 years ago, and in the county we put on demonstrations, and you look at the map of our county and the soil-conservation work is in spot areas over the county. One farmer saw his neighbor put in soil conservation and that it was paying him off, then the neighbor started out. A farmer is about as hard-headed a businessman as you can find, and if he finds something that makes money he does it.

Mr. HOPE. How long have you had a soil-conservation district in Marshall County?

Mr. STOCKWELL. Marshall County is one of the oldest ones established. I am not familiar, but I think it must have been 8 or 10 years ago that it had been set up 60 percent.

Mr. HOPE. You mean 60 percent of the land has been brought into the program?

Mr. STOCKWELL. That have signed their applications, are working on them.

Mr. HOPE. Are they as high in that county as in other counties?

Mr. STOCKWELL. Yes.

Mr. HOPE. That is as far as the technical activities are concerned?

Mr. STOCKWELL. Yes.

Mr. HOPE. That is because of the lack of trained men and lack of appropriations to carry on that work?

Mr. STOCKWELL. Yes.

Mr. HOPE. You would be going faster in Marshall County, I take it, if you had the trained personnel and the appropriations that would enable the Soil Conservation office to employ trained personnel to go ahead?

Mr. STOCKWELL. Yes. One of my neighbors came to me recently. He bought a new piece of land and wanted it terraced, and I referred him to the Soil Conservation office. After he came back he said, "I want to get the terraces in this year; and, if I go into it, it will be 2 years before they can process me," he said. "I bought the land this summer and want some protective measures." So, we had arranged for him to get a survey made out of the Soil Conservation office, but it will be inadequate because the man that laid it out is not trained to plan out a complete system. You can terrace out a corn field, but planning for a farm is a delicate thing to balance up.

Mr. LOVRE. The soil conservation and land treatment is absolutely necessary to any over-all program such as this, but let me ask you: Do you feel under the circumstances the progress under the Pick-Sloan plan should be retarded as of now?

Mr. STOCKWELL. In view of this rainfall we had this year, the pattern of rainfall, the intensity of the rainfall, a project that was authorized 15 years ago should certainly be restudied and brought up to a detailed report. Since flood control is of national concern, if a project can be shown as feasible it should be setting progress, but in these critical times I feel there should be a detailed report brought up to date and not based on previous estimates. I think this watershed program should be set out as soon as we can and integrated and taken into consideration. The saving would be tremendous.

Mr. LOVRE. In other words, both programs should be pushed as far as possible and coordinated and integrated as one program?

Mr. STOCKWELL. That is right.

Mr. HOPE. You are assuming, I take it, that when the Pick-Sloan plan was worked out, since there was no Missouri Valley agriculture program, whatever benefits might come from that program in the way of flood control were not taken into consideration; is that your contention?

Mr. STOCKWELL. That is my contention.

Mr. HOPE. And that, before the projects which have not been yet undertaken under the Pick-Sloan plan are carried out, there should be a further study and an integration into those plans of the Missouri Valley agricultural program?

Mr. STOCKWELL. That is right.

(The following study was submitted by Mr. Stockwell:)

FLOOD CONTROL IN REVERSE

To Whom It May Concern:

The Blue River Study Association unanimously opposes the construction of the Tuttle Creek Dam at its present proposed site for reasons listed in this brief.

All facts and figures herein presented were gathered in 1944 through a comprehensive survey of the rural and urban areas affected and were revised in 1947 in the light of current prices, with further upward revision in 1951.

The association has agreed upon counterproposals which are respectfully submitted for the serious consideration of the proper authorities.

Arguments in opposition to the construction of the Tuttle Creek Dam at its present proposed site are as follows:

1. Agricultural destruction would be too great

(*a*) Initial farm losses incurred would total $11,276,556.

(1) Farm lands, including at least 55,000 acres valued at $8,250,000, would be taken out of production all or part of the time, with a great part inundated permanently.

(2) Farm buildings and permanent fixtures valued at a total of $3,026,556 would have to be abandoned.

(3) Only the most valuable and most productive land would be purchased by the Federal Government, leaving thousands upon thousands of acres of pasture land in the surrounding hills which would be of comparatively little value without the bottom land that produces the necessary grain and feed crops.

(4) Possible damage to land below the proposed dam.

(*b*) An annual recurring loss of $6,121,233 would begin building up year after year if and when the land is taken out of production, since livestock and crops produced for market reach that figure annually. In 1947 the 55,000 acres in

question produced for market (1) 10,541 head of cattle, valued at $1,159,510; (2) 125 horses and mules, valued at $6,019; (3) 16,733 hogs, valued at $803,184; (4) 1,690 sheep, valued at $26,020; (5) Profit on 7,000 head of cattle purchased and grown for market, $530,250; (6) 163,247 chickens, valued at $176,243; (7) 124 ducks, valued at $149; (8) 44 geese, valued at $111; (9) 63 turkeys, valued at $292; (10) 781,749 dozen eggs, valued at $273,612; (11) 840,525 gallons whole milk, valued at $210,133; (12) 50,253 pounds butterfat, valued at $30,151; (13) 3,128 gallons cream, valued at $6,256; (14) 967,197 bushels of corn, valued at $1,465,302; (15) 197,014 bushels of wheat, valued at $482,608; (16) 90,984 bushels of oats, valued at $81,885; (17) 1,763 bushels of barley, valued at $2,644; (18) 2,655 bushels of flax, valued at $15,930; (19) 3,094 bushels of soybeans, valued at $7,735; (20) 7,028 bushels of rye, valued at $19,327; (21) 64,723 bushels of kafir, valued at $97,084; (22) 8,889 bushels of brome, valued at $44,445; (23) 2,420 bushels of other grain, valued at $2,420; (24) 17,911 tons of alfalfa, valued at $394,042; (25) 56,785 tons of silage, valued at $374,704; (26) 5,822 tons of native hay, valued at $87,330; (27) 10,087 tons of other forage, valued at $60,523.

The above figures represent a total annual minimum recurring loss of $6,635,977.

2. Destruction in seven small towns which would be inundated would be too great

(*a*) Initial losses in business buildings and residences would reach a total of $806,550, with the individual losses as follows:

(1) Garrison, $28,450 in residential property and $22,250 in business property.

(2) Stockdale, $17,500 in residential property and $2,500 in business property.

(3) Randolph, $236,300 in residential property and $267,000 in business property.

(4) Cleburne, $75,050 in residential property and $62,500 in business property.

(5) Bigelow, $45,000 in residential property and $50,000 in business property.

(6) Irving, $240,000.

(7) Blue Rapids, $126,000.

With the grand total standing at $568,300 in residential property and $504,250 in business property.

(*b*) A recurring loss of earning power of the business in the five towns amounting to $299,100 each year would immediately begin building up if and when these businesses become lost to the area. This figure would add to itself a like amount each year during the entire life of the dam. In 1 year net returns from business in the five towns are:

(1) Garrison, net earning power, $16,200.

(2) Stockdale, net earning power, 3,400.

(3) Randolph net earning power $185,500.

(4) Cleburne, net earning power, $46,000.

(5) Bigelow, net earning power $48,000.

(*c*) At least four other towns would lose substantial parts of their earning power. This group and percentage of loss, as estimated by businessmen in the area, include:

(1) Frankfort, with an estimated loss in earning power of 20 percent.

(2) Irving, with an estimated loss in earning power of 45 percent.

(3) Blue Rapids, with an estimated loss in earning power of 45 percent.

(4) Manhattan, with an estimated loss in earning power of 20 percent.

(5) Marysville, with an estimated loss in earning power of 20 percent.

(*d*) No provision is made to pay for loss of business earning power.

3. Social destruction would be too great

(*a*) At least 1,500 persons would be forced to leave farms which have been their family homes for as long as 90 years.

(1) The farm area includes homes of 500 families.

(2) More than 100 of the farms have been in the same family for more than 40 years.

(3) Thirteen of the families have owned the farms for 85 years, while one family has owned its farm for 90 years.

(4) An aggregate of 13,600 years of living on the land has produced in this area one of the most stable communities of the Midwest, from which each year many young men and women go out to serve the communities in which they settle as doctors, lawyers, nurses, teachers, and as members of other professions. The outstanding success of the several generations of youth of the area must, in a large part, be credited to their fine background and the influence of their community upon them in social lines.

(*b*) Approximately 230 town homes would be inundated as would about 80 business establishments in the same area.

(1) The homes making up these small towns have been in many of the families for generations, and the wealth of tradition and love of home which is found in most of them is a contributing factor of great force in the stability of the entire area, although this value cannot be measured in dollars.

(2) Business houses in these small towns have not only been handed from father to son for several generations, giving them the flavor of institutions, but they have been the meeting place as well as the trading place of friends for generations. The value of this stabilizing influence cannot be measured in dollars and cents.

4. Miscellaneous destruction would be too great

(*a*) An example of initial miscellaneous losses shows that the figure would run to well over $1,526,358.

(1) A gravel plant valued at $75,000 would be lost or seriously handicapped.

(2) Union Pacific Railway losses would total $1,041,358.

(3) Kansas Power & Light Co. losses would total $410,000.

(*b*) Annual recurring losses, using the examples listed above, would run to more than $136,437.

(1) Taxes on the gravel plant amount to $23,348 yearly, while the annual earning power of the plant is about $65,051.

(2) Taxes paid by the Union Pacific Railway total $19,869, while the annual earning power is $28,169.

(*c*) Other cities, including Blue Rapids, Manhattan, and Marysville, would sustain great damage.

(1) From 20 to 40 percent of the retail-trade territory of both Manhattan and Marysville lies in the Blue River Basin.

(2) Dike systems would have to be maintained by both Manhattan and Marysville.

(3) The gypsum plant at Blue Rapids would have to be protected by a levee which would have to be maintained by the city.

(4) The Manhattan trade territory has already been decreased by 36 sections due to the expansion of Fort Riley during the war.

(*d*) Annual tax losses, at the lowest estimate in the several counties, would be at least $87,500, even when Federal funds to be paid to the several counties are considered.

(1) Tax losses would be $110,000.

(2) Returns are figured at about $22,500.

(*e*) Transportation facilities would be required to relocate.

(1) The Union Pacific branch line would have to be moved or abandoned.

(2) Highways K–13, K–9, K–113, and K–16 as well as numerous county and township roads would have to be relocated.

(*f*) Many schools, churches, cemeteries, and public utilities would either have to be moved or done away with.

(*g*) The Blue Valley farmers probably produce more fat cattle, hogs, and sheep than any other territory of equal size for the Kansas City and Topeka markets.

5. The whole project appears to be highly impractical

(*a*) The reservoir will fill up with silt eventually.

(*b*) The flood damage suffered in the past 41 years has not been great enough to justify the permanent removal from production of 55,000 acres of the most fertile and productive land in Kansas.

(*c*) Only about 10 years ago the War Department issued a circular letter under date of June 7, 1937, in which it was declared that "The benefits to be derived from flood-control works in the Big Blue Basin do not justify the expenditures necessary for their construction."

(1) If flood control was definitely impractical in 1937, it seems fair now to ask: "What new considerations have come into the picture which seem to make such flood control practical now?"

COUNTERPROPOSALS

The Blue River Study Association submits that it is in no way opposed to flood protection and that, in fact, it favors protection highly, but it seeks to gain that protection without unnecessary destruction.

With the belief that the floodwaters on the Blue River may be controlled effectively without resorting to the construction of the proposed Tuttle Creek Dam, the association respectfully submits the following counterproposals:

We of the Blue Valley have petitioned Congress to work out a complete watershed program embracing soil conservation and land-use measures, retention dams in small streams, dikes and levees, proper flood channels past cities and dry storage dams where necessary. We want a complete honest flood control for everyone, not a partial flood control for a few.

Promote, intensively, soil-conservation practices in the entire Blue River Basin, such as contour farming, terracing, seeding, slopeland to heavy grasses, and constructing many farm ponds

(*a*) Two very important aspects of the rainfall and runoff characteristics of this region have been almost totally ignored in the studies that purport to justify the construction of the Tuttle Creek Reservoir. These are—

(1) The steadily receding ground-water level in the uplands adjacent to the Blue Valley.

(2) The intense local flash floods that plague the farmers of the tributary valleys.

(*b*) Thousands of upland wells have failed during recent decades and thousands more yield only limited supplies as a result of progressive depletion of ground-water supplies. Some upland pastures are seriously impaired in value by reason of lack of adequate water. Intense local concentrations of rainfall repeatedly cause sudden flooding of creeks with disastrous results. The total damages inflicted by these local floods may equal those inflicted by the more spectacular but less frequent major floods on the main river. The total storage capacity of the soil, subsoil, and bedrock is unknown but very large. Numerous strata of jointed and porous limestone extend throughout the area and their combined capacity is undoubtedly the equivalent of many years of rainfall.

(*c*) The construction of properly designed detention and infiltration basins in the tributary valleys, above the outcrops of these strata, would—

(1) Protect many thousands of acres of creek valley land from recurring floods.

(2) Protect various communities such as Marysville and Beatrice from flood damages.

(3) Recharge the depleted aquifers that formerly furnished ample supplies for large areas of uplands.

(4) Maintain dry weather flow of all streams through increased flow of springs and seeps.

(5) Make entirely unnecessary the construction of large reservoirs such as Tuttle Creek.

(*d*) According to the published records of the Kansas Division of Water Resources the drainage area above the Blue River bridge at Randolph is 9,100 square miles. This is 95 percent of the area above Tuttle Creek Dam site. The annual runoff varies from 241,000 to 1,394,000 acre-feet with an average of 908,000 in 26 years of record. This is an average of 99.78 acre-feet per square mile per year, or 1.87 inches of rainfall. The annual rainfall is approximately 31 inches. The runoff is, therefore, only 6 percent of the total rainfall and this includes an undetermined amount that has been absorbed by the soil and later discharged as the flow of springs. The dry weather flow of the river is almost entirely the flow of springs. It is conservatively estimated that the general practice of soil-conservation methods might reduce the immediate runoff by as much as 1 inch per year. This would add a proportionate amount to the flow of springs, thus increasing the dry weather flow and reducing flood peaks. This would very greatly reduce the total reservoir capacity required for the regulation of the flow of the river.

(*e*) It has been said, upon good authority, that 21 times as much plant food is carried away from the land each year by runoff water as is used in growing of farm crops.

CONCLUSION

In conclusion, members of the association wish to point out that they feel that the cost of the proposed Tuttle Creek Dam would be far greater than its worth. To begin with, it would cost $8,250,000 in farm land, $404,250 in town business concerns, $402,300 in town residences, $1,526,358 in miscellaneous property, and an immeasurable amount of business good will and traditional back-

ground. In addition to this, there would be an annual recurring loss of $6,121,233 in farm crops and produce and an annual recurring loss of at least $299,100 in business earning power, besides an annual loss of at least $233,937 from miscellaneous sources. While engineers estimate the cost of the dam to be $68,000,000, a figure which might cover the main initial costs, they apparently have failed to consider the $6,644,270 annual earning power of the valley. Since this annual farm and business loss is a recurring loss, it would accumulate each year. At the end of a relatively short period, 20 years, for example, it would reach $132,885,400, or an amount nearly equal to twice the original cost of the project. And this figure—this loss—will continue to grow forever.

The Blue River Study Association agrees that the area needs flood protection, but stands firmly against flood destruction. Certainly the up-river control of water would give the Blue and Kaw River Valleys the flood protection needed and thereby make this valley even more productive. Nearly all river valleys are widest and most productive near the mouth of the stream. Consequently, upstream control of water would be less destructive and would be at points where land is less productive and less valuable than would be the case in down-river water control.

Certainly the up-river control of water would give the Blue River Valley the flood protection it needs and make it even more productive than it now is.

G. D. STOCKWELL,
Chairman.
F. W. PFUETZE,
Secretary.

ACKNOWLEDGEMENTS

The Blue River Study Association greatly appreciates the invaluable assistance rendered by the Chamber of Commerce of Manhattan, Kans., in the development and preparation of this report.

Mr. HOPE. The next witness is Mr. William Avery, Wakefield (Kans.) Watershed Association.

STATEMENT OF WILLIAM H. AVERY, REPRESENTING KANSAS WATERSHED ASSOCIATION

Mr. AVERY. Mr. Chairman, ladies and gentlemen, I don't know what I have to say, but I think you will be able to hear it. I want to say first that, as a Kansan, I am very grateful to the committee for coming into Kansas. I think this may go down in Kansas history as the first flood-control meeting in Kansas or west of the Potomac. I think everyone feels grateful for the time and energy you have given us to come into Kansas. I think it renewed their faith in democracy when the chairman announced that everybody would be heard. I know it means a lot to me, and I am sure it does to everybody in this room. My name is William Avery, and I am a farmer and stockman of some sorts, out in Clay County, Wakefield, Kans. At this time I also have the honor of representing my county in the body that presides every other year in this room in the State legislature.

I would like to digress a little bit here. Of course, it was my understanding this hearing was to be on the Missouri River Basin agricultural program. I would like to make a little more of a Kansan's approach on this subject. We endorse every principle of the Missouri Basin program as you have it before you and all of its ramifications. We do feel, however, because of the magnitude and size of the program, we would like to talk to you just a little bit about how it affects us Kansans and what our ideas are on it. Now, Mr. Payton and Mr. Stockwell opened that channel just a little bit, and I would like to go on from there. In Kansas we have already done some organization

ourselves pertaining to the watershed areas. If there was any benefit from this last major flood we had this summer, perhaps that is the one thing that came from it. People became aware of the rapid depletion and erosion of their land from uncontrolled water runoffs. I think the figures state it takes about 3 acres of land to support the average American person, as far as food requirements are concerned. In our present population and in cultivated acres we are just about in that balance, about 3 acres of cultivated land to every citizen in the United States. Also with the kind of land treatment we have now, we are losing about 500,000 acres of topsoil a year. So, I think that should convince everybody that that is a serious problem here. Even if you ignore the flood aspect, there is a conservation aspect that merits all the time and energy, even though we knew we were not going to have a flood.

We have at the present time four or five watersheds that are organized. We are still groping a little bit for the right procedure, as it is a little bit new. The pattern is new. I feel like we are pioneers a little bit in this respect. The best approach seems to be to form a nonprofit corporation for a particular watershed area; and, as I say, five areas have done that already. Until we get further recognition in the way of appropriation and authorization, it is all we can do at this phase of the work through the Soil Conservation Service and set-up at this time, and that is our project up to now. We might just as well serve notice on the committee now that after we get better organized we are coming back and asking for authorization and appropriation. That won't be entirely new. Before the last session of Congress you had at least two before you. I refer to the Delaware association ,and I think there are several more. That is the general pattern we are following and hope to pursue. Now, as evidence of Kansans being serious about this thing, I think the records of the Soil Conservation Service will prove that. I won't go into that. Mr. Stockwell gave you a pretty good discussion on that. Just one thing or one figure I would like to give you. Since the end of World War II, there has been a 500-percent increase in the number of applications filed with the State Soil Conservation Service. By the way, that was ending in 1950. That rate has accelerated considerably faster since the flood of last summer. Now, there is another thing about the Soil Conservation Service that appeals to us, and I refer back to Soil Conservation because at this time that is the only agency we have existing to cooperate along the lines we have to follow. I probably should not say "the only" one. I should say it is the one best qualified and that fits into our pattern. Their work is not planned and brought to you by saying, "Kids, this is it. Get out and get busy." Their plan, their approach, has been a plan, a very comprehensive plan, and then voluntary on the part of the people within the area, whether they shall cooperate or not. By the percentage of increase there has been in the applications, I think it is proven beyond a doubt that Kansans are becoming very conservation-minded.

Besides these four areas that have already been organized—and it could be five, it is in the stage of organization right at the present time—I know of three others that are in the process of organization. The one in the Republican Valley is one. Geographically, it leaves

Colorado and goes into Kansas. I use that for an example because several river valleys in Kansas are in more than one State. It is our plan for one watershed organization to be formed within the area that is in Kansas and then cooperate with the one that is in the other area; in any case, in Nebraska. Even in that State negotiation has begun. Just as Mr. Payton represents the Kansas-Nebraska Watershed Association. That is why the over-all picture ties in. We want to progress as single units, but in the over-all picture our efforts are all coordinated together.

Just one closing observation that probably might indicate to you the popularity of this program in Kansas. It is the only proposed flood-control program in Kansas that has the endorsement of practically every existing State organization. What I mean by that is, the principle of this watershed treatment has been endorsed by the Kansas Farm Bureau and the Kansas State Farmers' Union, and has now been endorsed by almost every newspaper in Kansas, the State chamber of commerce, and I could go on from there. It is the only suggested plan of flood control that has the endorsement of practically every agency in the State, and I also want to mention our own State board of agriculture. That is the only official voice of agriculture in Kansas.

With your attention, I would like to read a resolution from their last annual meeting, which occurred last January.

REPORT OF RESOLUTIONS COMMITTEE OF KANSAS STATE BOARD OF AGRICULTURE, ANNUAL MEETING, JANUARY 1951

In representing more than 140,000 Kansas farm leaders as official delegates to the Kansas State Board of Agriculture annual meeting, we express our common beliefs and resolve that—

* * * * * * *

5. SOIL AND WATER CONSERVATION AND FLOOD CONTROL

Soil and water are recognized as the State's most valuable natural resources. It is urged that the United States Department of Agriculture be authorized to accelerate and intensify its program of soil-erosion control and its program of runoff and water-flow retardation throughout the State. To that end the Missouri River Basin agricultural program now before Congress and the report on soil- and water-conservation measures for the Neosho River Basin, now before the Secretary of Agriculture, are endorsed and approved. We recommend that complete soil-conservation and water-utilization treatment of some watershed in the State be undertaken promptly in order to demonstrate its effectiveness.

We recommend that any flood control, irrigation, or reclamation project authorized by Congress, that is not under bona fide construction within 5 years from date of authorization, shall be automatically dropped from the approved list.

* * * * * * *

Mr. POAGE. I would just like to have some idea how far you think the committee ought to go in authorizing these upstream projects. You understand what we have got to finally do, get down to the point of not simply generalizing and agreeing it is good but how much money should we spend, because, after all, it is tax money we are going to spend. How much of it should we spend? How many projects shall we authorize? I know you cannot tell us exactly.

Mr. AVERY. I would say first do this: authorize one project as a demonstration project.

Mr. POAGE. There are now 11 authorized in the United States that are in operation. I say "in operation." They get about $6 million

a year for the 11, and you can understand you cannot do very much flood-control work on $6 million scattered through 11 projects all over the United States of America.

Mr. AVERY. Well is your question, How many more dollars should be appropriated?

Mr. POAGE. Yes.

Mr. AVERY. Let's approach it this way. Of course, for a farmer in Kansas it is pretty hard to think in terms of congressional appropriation.

Mr. POAGE. I am just trying to get some idea. Do you think we ought to undertake this whole Missouri Valley or just two or three projects or enough projects that the sum total of them would probably materially control the Kansas rivers. Should we undertake them all at once or shall we undertake to carry a few of them pretty well to completion. We have to make that decision: whether to spread our money thin over a wider area or whether we should concentrate within a few areas.

Mr. AVERY. The idea would be to authorize them all, of course. We know that is impractical, physically and financially. I speak only for myself in answering that way. I would prefer that one or two or three key projects in Kansas and possibly other States be authorized, and then as soon as possible—I don't say you should wait until they are absolutely completed, but as soon as money is available—to expand. Bring them on in the order they come, in the order of importance, according to your judgment.

Mr. POAGE. But you do agree we should spend a good deal more than the present $6 million?

Mr. AVERY. I certainly do. It is hard for us to understand why the rivers and harbors get it and the Department of Agriculture has to fight for every dollar they get. If you take nothing else back to Washington, I wish you would take that one question back: why the river and harbor appropriations are unlimited; yet, when we try and get an authorized appropriation for something in Kansas, we just fall flat.

Mr. POAGE. I am sure you understand that there are about four people living in a large city to one living in the rural areas, in the first place, and when you put an agricultural label on any program today a lot of people look at it and see red, whether it is printed that way or not. They simply feel we are gouging the public. Now, that is another subject.

Mr. AVERY. It is certainly a recommended subject.

Mr. POAGE. But certainly there has been a great deal of unfair publicity go out over this country that has led the people of the United States to think the farmer and stockmen of this country have been getting too much for their contribution. Of course, that is not true and we could go into that, but that is another hearing. But that is one of the reasons it makes it difficult to get an appropriation that is labeled to serve agricultural areas. When you build a great dam above some city that is without water, as every city in Texas is and a good many others in the United States, and label it "flood control" and expect that city to be provided with industrial water at the expense of the American taxpayer under the theory of flood control, then, of course, you get a tremendous amount of support because it takes away

from that city's burden. Most every big city in the United States is doing its best to create a flood situation, flood-contribution situation, create a situation so that they can come in and claim some of the flood money because it will provide money for them and recreation that somebody suggested wasn't too badly needed in Kansas. But that is one of the reasons, when you say you can't understand and when I say I cannot understand. Of course, what we do understand, if we think it through, is that primarily the farmers are in the minority; that the urban centers in America are by far the largest and, therefore, have the largest voice in the Government.

Mr. AVERY. We understand the point you are trying to make about the flood control, as applied to Kaw Valley.

Mr. POAGE. It is not confined to Kaw Valley.

Mr. HILL. What percentage of this audience, or what percentage of farmers from what you have seen in Kansas, would join in a soil-conservation program and stick by the program?

Mr. AVERY. I would prefer you stay with the first part of your question and refer to this audience, and I would say a hundred percent. That isn't true in Kansas. In any one county it runs 30 percent. I think you should bear in mind this particular year has retarded all soil-conservation work as well as crop production. After all, this work has to be done to the land; and with the season we have had this year, we couldn't even harvest the crops properly, let alone do any soil-conservation work. Before we are entitled to authorization or appropriation, as I understand it, 75 percent of the landowners in the individual watersheds must be signed up.

Mr. HILL. That is acreage-wide, not numbers.

Mr. AVERY. That is acreage-wide, 75?

Mr. HILL. I am asking you. Isn't it acreage, rather than the number of farmers?

Mr. AVERY. I can't answer that. I have a good authority here that says it is.

Mr. HILL. Tell me what percentage would be your suggested idea that the committee might carry back? Suppose somebody says, "What percentage of those fellows will cooperate?" and I say "I don't know; maybe 2 or maybe 10?"

Mr. AVERY. I say 75 percent.

Mr. HILL. If properly presented to the farmer in Kansas?

Mr. AVERY. I mean, and with sufficient assistance.

Mr. HILL. You think you can work it up to 75 percent without any trouble?

Mr. AVERY. I think so.

Mr. HILL. That is an important answer.

Mr. AVERY. That is my own personal opinion.

Mr. HILL. That is what I asked for, your personal opinion.

Mr. LOVRE. What portion of the State of Kansas is already organized into soil-conservation districts?

Mr. AVERY. They are organized by county, and I think practically all but two counties have soil-conservation districts. I might add that there are 105 counties in Kansas.

Mr. LOVRE. And 103 counties are organized as of now?

Mr. AVERY. Yes.

Mr. HILL. So, you have the ground work already laid?

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Mr. AVERY. That is right.

Mr. HILL. So, if we can get the proper overhead organization and assistance——

Mr. AVERY. Yes; and, of course, trained personnel.

Mr. HOPE. Following up the question Mr. Poage asked you awhile ago, which is a very pertinent question and a very vital question, to my way of thinking—namely, as to how much money should be made available for a program of this kind immediately or in the near future—do you think, looking at it from the standpoint of flood control—let's just look at that now from the standpoint of flood control alone—that a substantial contribution could be made to flood control if Congress would appropriate a sufficient amount of funds to enable the Soil Conservation Service to catch up with its applications for technical service on individual farms? Now, that, in my opinion, would not cost too much money as we look at money in these days. I am wondering if you think that would be a substantial step ahead if that could be done.

Mr. AVERY. That would help a lot, but we might just as well face the fact, if the Soil Conservation catches up, probably the PMA will probably run behind in its assistance. We have ruined this summer because the people could not complete the practice because of the weather.

The CHAIRMAN. As I understand, in a good many counties the difficulty in carrying out the program has not been due to the fact the farmers are waiting upon PMA payment but due to the fact that there hasn't been technical assistance available to enable the farmer to work out a plan; is that right?

Mr. AVERY. That is true in a number of counties, but not every county.

Mr. HOPE. What about your county?

Mr. AVERY. As I say, the weather is what has stopped us in my county. I think there are plenty of technical plans now completed to keep us busy for quite a while, because we haven't turned a wheel all summer, you might say.

Mr. HOPE. So, it is not lack of personnel?

Mr. AVERY. Not in my county; no.

Mr. HOPE. According to Mr. Stockwell, he was taking the State as a whole?

Mr. AVERY. Yes. There is a shortage of trained personnel within the service itself.

Mr. LOVRE. Isn't there enough incentive in soil-conservation practices without soil-conservation payment?

Mr. AVERY. I would like to answer this way: If every farmer owned his farm, that would be all right; but, when you get to the landlord-and-tenant proposition, I am sorry, I will have to say "No."

Mr. HOPE. In other words, you have to have soil-conservation payment in case there are tenants on the farm?

Mr. AVERY. No; but I mean, that is the bottleneck, right there, and probably we might just as well admit they will cooperate to a greater degree when they have payment, but when you come to a landlord proposition, you can see that he says, "Why should I spend a thousand dollars for that guy? He is getting too much already." That is the

situation you run into, and I can't truthfully say we could complete it without PMA assistance, because it wouldn't be true.

Mr. CHRISTOPHER. How much would it cost to build a terrace and build the waterways and put in the soil-conservation system that you figure necessary, what would be the average per acre on a farm in the eastern half of Kansas? If you had 160 acres of no terraces or waterways on it or dams or anything, just like the farms I have been looking at as I drove up here, what, in effect, would be the average?

Mr. AVERY. That is a very good question and a better question than I can give you an answer to.

Mr. CHRISTOPHER. Do you think I would be out of line if I should say $25 an acre? Would that be conservative?

Mr. AVERY. Yes, but that is my own opinion. I am not using any official figures on that.

Mr. CHRISTOPHER. If I owed half of the purchase price of that farm in the form of a mortgage, would you consider me financially able to start that program and carry it to completion without danger of losing title to my home?

Mr. AVERY. You mean without PMA assistance?

Mr. CHRISTOPHER. Yes. Let's get down to brass tacks about this thing.

Mr. AVERY. All right; let's do.

Mr. CHRISTOPHER. Take the case of a GI who has just bought his farm. What is he going to do without PMA?

Mr. AVERY. I am not arguing against it. I am for more PMA.

Mr. CHRISTOPHER. I understand. That is why I want to shake your hand.

Mr. AVERY. I am not fighting. I am with you.

Mr. HOPE. Thank you. Is that all? The next witness is Dan O. Cain, president of the Perry Flood Control Association.

STATEMENT OF DAN O. CAIN, PRESIDENT, PERRY FLOOD CONTROL ASSOCIATION

Mr. CAIN. Mr. Chairman, ladies and gentlemen, it gives me a great deal of pleasure to appear here today. I have come in behalf of the Perry Flood Control Association, and as its president I came here to agree with about everybody who has a plan to offer; that is, a plan submitted on soil conservation and under the Missouri soil conservation agricultural plan. To begin with, I want to state I feel from an agricultural point of view these practices are very, very necessary from a crop-producing standpoint. We feel that in order to prevent the major floods it is necessary to have your large dams. Now, the town of Perry and the farmers in all directions from there in the Kaw Valley west and east of Perry and Delaware River have suffered a great deal of damage to farm lands and crops. We have had a total loss of crops in 1941 and 1945 and this year. In other years, in the interim, we have had a loss in crops of from 75 to 50 and 25 percent in all years except two. This year, of course, we had the big flood on the Kaw, which was very devastating, as most everyone has seen or had occasion to read about.

My remarks will be brief, but I would like to comment on the chart that Mr. Brown showed here a while ago. We are in an area of very heavy rainfall. I think this chart shows we run normally from 24 to

36. I believe those are the figures of the last few years. I think we have been running 46. Therefore, we feel that it takes all these practices in this area to control floods. Gentlemen, I believe that will be about the size of my remarks, except that in the Daily Press this summer here in Kansas, it was quoted that Hon. Wint Smith, Congressman from Kansas, said that prior to the big flood—they called it the second one—the flood measures, soil-conservation practices and anything that might detain water or hold water, keep it out of the flood stream were not functioning, and it was just the same as if they were not there. Therefore, we feel to prevent the major floods it is necessary to have your large dams.

Mr. POAGE. I want to ask you, Mr. Cain, about the relevancy of the statement you quoted about Congressman Smith, which as I understand was to the effect that at the time of the big flood, when it came last summer, all of the existing stock ponds and other upstream structures were full of water and, therefore, that since they were full at that time, that you feel the upstream treatment is inadequate to control or to minimize floods.

I do not think anyone claims that any of the systems will completely control floods. There has never been any upstream program in Kansas, has there?

Mr. CAIN. We have built a lot of ponds in Kansas.

Mr. POAGE. A lot of stock bonds but you haven't built any upstream retention dams, have you?

Mr. CAIN. No. We have had soil-conservation practices in Kansas for I can't tell you how many number of years, but a great number.

Mr. POAGE. But wait a minute. Your soil conservation for Kansas, wasn't it exactly like it was in Texas, for the purpose of protecting the soil on the individual farm? That is as far as soil conservation has gotten in Kansas, isn't it?

Mr. CAIN. I think so, yes.

Mr. POAGE. What we are asking, what this committee is seeking now, is to determine whether it is worth while to extend those practices to build the structures and carry on the practices that intervene between the farm and the point where you reach the Army engineers' big dams. That is the retention dams, structures such as Mr. Payton gave the figures on, where in Oklahoma they built 34 small reservoirs on one small creek valley. Those are not stock ponds. Those are retention reservoirs where they keep empty space. Any farmer is going to keep his stock pond as full as he can keep it. That is what he built it for. Consequently, when you condemn a program simply because you did not have the program it seems to me it is rather inconsistent.

Mr. CAIN. You asked me for an answer?

Mr. POAGE. Yes. I am wondering why you say the fact you did not have a soil-conservation program proves it would never be effective.

Mr. CAIN. Whatever this program would develop into, whatever it is, retention dam, and so forth, I don't know the volume they would hold. If not full and running over when you have a crest, naturally, they will be of great assistance.

Mr. POAGE. That is right, and the figures that have been presented indicate at least, and I don't vouch for the figures, and I understand the gentleman who gave them to me does not claim them to be accurate, that by building a number of relatively small dams, in this case 34,

which had a total detention capacity of approximately the same as one of the larger dams, but which all 34 could be built for about one-third of the larger dam, that you would get storage space at substantially less than you would get in the larger dam. Now, I am not trying to tell you that you do not need the larger dam. If you do not have enough of the smaller ones you are certainly going to need the larger one.

Mr. CAIN. My answer is that I am not an engineer, but, visualizing how much your smaller dam would hold, they would perhaps be full and running over before this rainfall continued for a long period of time, and in my opinion they would be full and running over before the trouble happened the last week of the long period of rain. That is merely a layman's opinion.

Mr. POAGE. Doesn't it come to this, the question of how much storage to provide?

Mr. CAIN. That is right.

Mr. POAGE. If you have got to have a million acre-feet to protect a certain river valley, then if you provide it in 1 spot and, or if you provide it in 10 spots and you still have a million acre-feet, you have retarded the rived by exactly that same amount. Then doesn't the question finally wind up, Where can you build the cheapest?

Mr. CAIN. Some of the water you were retaining had already passed on down the valley in the days preceding the crest. It was getting away all the time. We had a full channel here through all that period. Therefore, the water that you might be holding up here a hundred or 200 miles was passing away during this period. However, we had a full channel all of the time. Then, when the heavy downpours came, of course, the overflow came in a big way.

Mr. POAGE. Then the next thing that arises, as I see it, where would you build the dams? Would you put them at the mouth of the stream?

Mr. CAIN. My group agrees on the approved and proposed dams.

Mr. POAGE. That is, approved and proposed by whom?

Mr. CAIN. By the Army engineers.

Mr. POAGE. Then you say that you would simply take the Army engineers' judgment, rather than take the judgment of the engineers of the Department of Agriculture?

Mr. CAIN. I don't know that there has been any other site proposed. The sites that have been proposed are agreeable, so far as I am concerned, with our association. May I ask a question? Has there been any other site proposed by the engineers of the Department of Agriculture?

Mr. POAGE. I understand the Department of Agriculture has proposed a number of small structures but I confess I am not familiar with where your Army engineers or Department proposes them, except that I know, generally speaking, that the Army engineers propose to put the dams farther downstream, and the Department of Agriculture proposes, generally speaking, to impound the water farther upstream.

Mr. CAIN. That is your small dams.

Mr. POAGE. Yes, and obviously the smaller dams have to be farther upstream. Carrying that thought out, would you suggest that the proper place for flood-control dams is at the mouth of a river, if you can put one there?

Mr. CAIN. It depends on what size dam you are speaking of.

Mr. POAGE. As I understand it, you feel the larger the dam, the better. As I understand it, you feel that a dam, 1 dam that will hold a milion acres would be better than 10 dams that would hold a hundred thousand acres each?

Mr. CAIN. No. I take into consideration the flow-off during a long rainy period. The river valley and channel getting away from a lot of water that might be held and would later become dead water during long periods of rainfall, if it is liberated early—well, it all depends on the nature of the flood. If it is a big flash flood you have a different situation than if you have a long heavy rainy season.

Mr. POAGE. Let's say this: As I understand, you are suggesting that we should let a lot of this water come down the channel of the river down to a given point, a point where somebody suggested we put a dam. It seems to me you should let that come clear to the mouth of the stream, if possible, and if you do that you wouldn't protect anybody on that stream. Obviously, the farther down you put your storage the less people are protected, and it seems to me the point simply gets to whether a man lives above or below the dam, and if he lives below the dam—I don't know where you live.

Mr. CAIN. If you recall, we had no fault to find with anybody's plan. We felt we needed them all. That was my original statement. But we feel we need large dams to protect us in case of large floods. Nobody knows how large a flood can get. As a matter of fact, we had to use an ark one time.

Mr. POAGE. Which would you use, an upstream or downstream dam? Where would you start your flood control? Would you start at the mouth of the stream or head of the stream?

Mr. CAIN. Not being an engineer, I couldn't say, but I would say, wherever you can get results the quickest.

Mr. POAGE. Where would you get results the quickest, with the same expenditure of money?

Mr. CAIN. I mean about time being involved in completing the structure, whether you could build a series of small dams and get protection next year or whether a big dam would take you much longer. I don't know which would take longer to construct, in order to get protection. What I am concerned about is protection, not after I am dead, but as soon as possible.

Mr. HILL. Mr. Poage explored the question I was going to ask, but now I will make a statement. Any danger that you apply to small dams being full of water, in my personal opinion, you just multiply that by a thousand and say a big dam is that much more dangerous, and there is no question about it. [Applause.] I know a little about this creek you are talking about, Grasshopper, we used to call it when I was a kid over here, and if you put a big dam along this Kaw River bottom—I am just thinking out loud myself—a big dam that will stop this Grasshopper Creek with its terrific watershed, if that dam ever goes out, Kansas City would be moved down to the mouth of the Mississippi River. I am just telling you my opinion. All dams can become dangerous. So everything you say about a little dam applies to a big one a thousand percent. So we have got to put the two to-

gether, the little dam up the stream first and not last. I don't think we can sell this program. We are salesmen. We have got to sell a program to the eastern people, whether you believe it or not. I can name you six States that pay 50 or 60 percent of the tax in the United States, and it is not Kansas and not Colorado. Now, those fellows are going to stand up and make more noise than they did when we were starting some irrigation projects in the West, when you are talking about dams like you are talking. In my personal opinion we have to start up the river and build the big dams later, if we find we have to have them.

Mr. CAIN. That is true. There were three cross-country railroads flooded. There were a lot of industrial institutions in Kansas as well as in other cities between here and New Orleans that were involved.

Mr. HILL. That is right. Now, I can tell you something you won't believe. A certain man got up in the House and said, "If we need irrigation water in Colorado, and they need it down on the river to run a boat, you feel the people down the river were there first, so they should have it first and our farmers go dry." Now, that is in the record. That is the kind of sales resistance we meet when we try to sell a flood project to the Congressmen, who hold the purse strings.

Mr. CAIN. I realize that large dams are not popular but I feel they are a necessity. As I say, I don't have any disagreement to anybody's plan. I think it takes them all to make a success.

Mr. HOPE. I think this has been pretty well covered by Mr. Poage's question, but I want to ask you this: You say you are for the whole program; that is, you think we should do everything to stop floods because it is a program that has been set up by the Army enginers, which you feel will protect your area. You say you dislike to have that disturbed. Now, that is your position; am I correct?

Mr. CAIN. No, I didn't mean necessarily being disturbed by this plan here. Now, if that was the case, that I gave you that understanding, I was not aware of it.

Mr. HOPE. You do not consider then the application of the Missouri Valley agricultural program or similar program in any basin would necessarily be in conflict with your idea of flood control?

Mr. CAIN. Not so long as it took big dams into consideration.

Mr. HOPE. Do you think that there ought to be a reconsideration of the dam on the Delaware River here until it could be integrated into a program which might involve the use of soil-conservation measures and soil treatment and the use of smaller reservoirs in the basin?

Mr. CAIN. I feel that it is necessary to have those plans to go along with your big control for the reason I have said. It is necessary from an agricultural standpoint to preserve the fertility of the farm. I think those are the two very important reasons. You keep your infiltration back and preserve fertility.

Mr. HOPE. In other words, if I understand, you believe you should start with the land and with the small dams where they can be made

effective; and, if they are not effective, then you should proceed toward the erection of the structures on the main rivers, large dams?

Mr. CAIN. Yes; I do.

Mr. HOPE. You think that would be a correct approach to the situation?

Mr. CAIN. Well, as I say, whatever can be accomplished, as soon as possible. I don't know. I am not an engineer. I don't know how you can get the results the quickest. But I am in favor of getting results as soon as possible, whatever the plan might be. So, at which end you might start to get results, I don't think I am in a position to say, not knowing construction or engineering any better than I do.

Mr. HOPE. You wouldn't want to start by building a big dam first and then working backward, would you? Does that sound logical?

Mr. CAIN. I think you can start on all construction.

Mr. HOPE. In other words, do you believe you ought to build a big dam without settling the question as to whether or not treatment of the soil and basins might not solve the problem, or at least solve part of it doing away with the necessity for so many large structures?

Mr. CAIN. I don't feel that in a severe a flood that will solve the problem.

Mr. HOPE. But it might modify the type of structure you would need in the way of a large dam, if you hold some of the water back. So the logical approach would be to start at the soil conservation, smaller stream level, and come down to the larger?

Mr. CAIN. Perhaps it would be.

Mr. HOPE. Any questions? Thank you.

STATEMENT OF J. W. FARMER, EUREKA CHAMBER OF COMMERCE

Mr. FARMER. I come from Greenwood County in the south central part of Kansas. The water from that country runs into the Verdigris River, Fall River, Cottonwood, and into the Neosho, so we are at the headwater of several streams that have caused flood damage, and are heartily in favor of starting some control, in favor of getting some construction to stop the water before it gets out of our country and before it harms the folks down below us. To our friends in Missouri and the folks down in Oklahoma, I would like to say that we think we can keep more flood water and more muck out of Missouri and and Oklahoma by upland structures than by a few big dams.

Getting back to one example, we have one big dam, the Fall River Dam, and the one thing I want to point out is that it protects very little land, whereas a large number of dams could have protected more. One dam, 1 percent net protection. The net gain in flood protection to agricultural land is about 1 percent of the area of the Fall River Valley in Kansas. After a big dam has been constructed, it is 99 percent unprotected and suffers from severe flood damage. I am sure the committee is aware of the fact that almost every small creek and every small river caused flood damage throughout Kansas this year. The Fall River is a tributary to the Verdigris River to the Arkansas Basin. The Fall River Reservoir provides practically complete flood protection to about 17,000 acres below the dam site. But, in order to protect 17,000 acres, over 15,156 acres have been taken in the reservoir area. All of the land hasn't been. There are some tracts around the edge that were left by the purchasing department

of the Army engineers, which have very little value after they were detached from the rest. So, considering the 15,000 acres from the area protected fully below the dam, we find we have a net gain of only 1,844 acres, which is about 3 square miles. In our little valley we have 874 square miles. Hence the net gain of 3 square miles is less than 1 percent of the area of that valley. So we have one big dam, and we really have about 1-percent protection to our valley.

I will refer you to the book called Work of the Corps of Engineers in Kansas, dated July 1950, pages 9 to 11. Now, the Fall River Dam furnishes a limited degree of flood protection for many miles downstream. We recognize that, but experience shows in this last year that the protection from the big dams does not extend much more than 20 or 25 miles downstream. About two-thirds of the Fall River Valley is in hilly pasture, with our best farm land on the creeks and small river bottoms. There are many excellent sites for flood-control reserviors over the entire valley. A complete watershed of flood control on the upland would protect the entire valley and furnish the same downstream protection as a large single reservior. A well-planned watershed program of flood control will also eliminate widespread drought. Back in 1934 and 1946 cattle died in our pastures for lack of water, and we were shipping water into the county by railroad. If we had had a large number of reserviors scattered over the entire area, we would have prevented the drought.

The reservior cost would be perhaps $12 million, when the cost of the other agencies are included, with the construction and land cost. The engineers' costs lie around 10 or 11 million dollars, but that doesn't take in, I believe, the cost of supervision, buying the land, and a number of other things we think should be included.

There are 573 square miles above this $12 million structure, and that means it costs $20,000 for each square mile to catch the runoff water from that square mile. Had the $20,000 per square mile been spent on that square mile or per section, we believe we could have protected the farm land there and given flood protection to farms clear on down the valley. Now, there have been some figures given to show the big return from the lease money from these reserviors, and that is an involved problem, but in a general way we can say this: Part of the reservior area is leased for agricultural purposes, and rental returns to Greenwood County in lieu of taxes and funds received were $6,000 in 1949, and $15,000 in 1951. The total we have gotten from that 15,000 acres has been $22,060.74. More funds have been collected by the Corps of Engineers and are in the process of distribution.

I believe we have sufficient sites in that area to handle the water. We have made some preliminary surveys. We have one lake that catches water from 16 square miles that has handled floods pretty well. So we are satisfied that we can handle, I will say, 50 to 75 percent of the area through retarding dam structures, and we can handle that up to an amount of 4 or 5 inches of rain in 24 hours. Those kinds of figures are lacking in Kansas. We need most of all money to find out just how much water we can store on the upper. But, when we find out the big dams protect only a very small percent of the valley that needs protection, then it looks like surely we should be spending the money on upland reserviors first.

I would like to add one more thought. Which can be built first? We can go out and survey 10- to 50-acre retarding dam sites in a day

or two. The calculations and blueprinting can be made within a couple of weeks. The thing can be built in a couple or, rather, in a few months. We believe you can get some flood protection faster through this retarding-dam program than we can by waiting for big dams to be completed. You can't put water into a big dam until it is all done. Anytime you build a small retarding dam you have got some protection, and we can get those built a lot faster, and also they won't take the critical materials like steel, copper, and high-grade materials that are required by the large dams.

I will be glad to answer any questions that I can. I appreciate having been given this much time. We have felt we have been neglected in Kansas in regard to what can be done as regards upstream land.

Mr. GEORGE. Was the rainfall east of you heavier than in your county?

Mr. FARMER. Yes.

Mr. GEORGE. The Neosho River heads over east of you folks. The flood damage in the Neosho River Valley was two or three times the flood damage that went down the Verdigris River. What you are talking about on that 25 miles is where you kept it within the banks, from going down.

Mr. FARMER. It wasn't kept within its banks. They had to release enough water to drown out the crops.

Mr. GEORGE. Did they go clear over the high banks or just the low bank places where the banks were not on the level?

Mr. FARMER. I won't say.

Mr. GEORGE. I mean back at the draws.

Mr. FARMER. The way I got this, it is what the farmers term the low bottoms. But, as I say, the same degree of flood protection could be obtained with upland reservoirs.

Mr. GEORGE. I think there is more benefit in going down the river, on the basis of what happened in those two river valleys, with about an equal rainfall between the Neosho and Verdigris and clear on down into Oklahoma .

Mr. FARMER. Greenwood County is part of the hilly range, part of the 15 counties in Kansas that are partly in the flood hill area, and it is not much different from some of the hilly land in eastern Kansas and some of the hilly land in the western part of the State, and we think that surely in Greenwood County we can take care of our own floodwaters.

Mr. HOPE. Thank you very much. We will recess until 1:30 p.m.

(A noon recess was taken.)

AFTERNOON SESSION 1:30 P. M.

Mr. HOPE. The meeting will come to order. We are honored this afternoon in having with us the Governors of two great States. I am going to call first upon Gov. Ed Arn, of Kansas, whom we all know, and who will make a statement before the committee at this time. Governor Arn.

STATEMENT OF HON. EDWARD F. ARN, GOVERNOR OF KANSAS

Governor ARN. Congressman Hope, Governor Peterson, friends, and the rest of your congressional committee, we of Kansas, of course, are very grateful to the subcommittee of the Agriculture Committee for their time in coming through our State and another State in trying to help solve the problem which is very vital to every one of us, everybody in Kansas, and everybody, of course, in this great midwestern area which has suffered one of the most devastating catastrophes in the history of the Nation. I wish that I were an Einstein or had a crystal ball or some means of putting my finger right on the real answer to this problem. Of course, I haven't a crystal ball and haven't that capacity, and I guess nobody else has, so meetings such as this are certainly valuable in trying to arrive at the proper answer.

I heard the chairman of this committee make a very appropriate statement at lunch as to just how you could determine who was for or against these dams. He may want to releate it to you later. But we do have varying ideas and views, of course, as to the propriety of one plan or another plan, or combination of all. Just briefly, my idea of the picture—and I am not an engineer, of course, and probably know very little about it, and what little I do know about it I have garnered from conversations and attending meetings and hearing speeches and reading literature and statements pro and con on the various plans really since our flood catastrophe started; and, as we all know, it didn't just start on the critical days of July 10, 11, and 12, but some months before that. It was something that affected not only the Kaw Valley and its tributaries, as far as our State of Kansas is concerned, but the Arkansas and its tributaries, Neosho, Cottonwood, and virtually at least one-half of our entire State, and in some instances even west of that. But I have a general idea that no single plan that we hear so much about is going to solve the problem. I think we must have a comprehensive plan embracing all of these features.

We certainly must have soil conservation with water-retention dams on the upper tributaries. Perhaps we need some dams on the main stems, and then certainly we need a system of dikes and levees. The thing that bothers me—and I might direct this primarily to the members of the congressional committee—here we have the Corps of Army Engineers going off in one direction, the Bureau of Reclamation in another, and the Federal department of soil conservation going off in still another direction. I would think the only way we can get the real answer to this problem—and it is certainly something which must be handled on a Federal basis principally—the only way we are going to get that accomplished is to get those three converged and get together and go down the same road; and, when they do that, I think we will come much nearer to accomplishing and finding the answer to this problem.

Now, we hear a lot, of course, about dry dams and multiple-purpose dams. Frankly, I think the big thing we want to accomplish in Kansas in that respect is flood control, and I think to do that we must have our attention directed principally to a single purpose. Now,

a lot of these other things are fine. Nobdy likes to fish or hunt any better than I do, but our chief purpose, the thing we must accomplish so that it will never happen again, is flood control. I think we can learn a great deal from the system that they have adopted in the State of Ohio, and that is the system of using the dry dam, as we call it. That certainly is where it is a single-purpose proposition that will do the job.

There may be some places throughout the State where your irrigation is a factor. I don't know. If there is, why, of course, that might embrace a dual purpose. But we do have some which are highly controversial, which are strictly flood-control matters, and it seems to me, with my meager knowledge of the situation, that the dry dam is the answer to that sort of case. But I say again I think it must be a comprehensive program involving some or all of these various plans. I think it is very necessary and vital that the people of Kansas get together as nearly as possible upon the right plan, and I think that the one thing which will promote that more than anything else would be some cooperation between these three Federal agencies, the Corps of Engineers, Army engineers; Bureau of Reclamation; and department of soil conservation. I think when that is done they will be in a position to give us much better help, much better advice than we have had up to now.

With that brief statement I want to say again to you, Mr. Chairman of your committee, to our Congressman from Kansas, to the committee, that we appreciate your interest in calling a meeting of this sort to help us with this problem which is so vital not only to Kansas but to this great midwest area, and to you folks who have come in to help also with your advice and suggestions and to learn more about the problem yourself, because it is something which many, many people of the State who are concerned with it in one way or another know so little about. Thank you so much.

Mr. HOPE. Thank you very much, Governor Arn, for your fine statement. We are happy to have had you appear before the committee here today.

I think everyone knows what the Governor of North Carolina said to the Governor of South Carolina, and I am now in a position to tell you what the Governor of Nebraska said to the Governor of Kansas at lunch today. He said, "We are going to win that football game next Saturday." Now, I don't know how much of a reputation the Governor of Nebraska has as to football prophecy, but I know he has made a great study of flood control and its problems, and we are very glad to have him with us today and grateful to him for making this trip to Topeka to appear before this committee. So, I am happy to present to the committee and to this group the distinguished Governor from your neighboring State, Governor Peterson from Nebraska.

STATEMENT OF HON. VAL PETERSON, GOVERNOR OF NEBRASKA

Governor PETERSON. Thank you, Mr. Chairman. Members of the committee, Chairman Hope, Governor Arn, and ladies and gentlemen of Kansas, I am here today in my capacity as Governor of Nebraska, as a member of the Missouri Basin Interagency Committee,

on which I have had the privilege to serve for 5 years, and as chairman of the River State Committee, which comprises all of the 10 States in the Missouri Basin, and it has been my pleasure to serve as chairman of that committee for the last 4 years. I am sorry I was not here to hear the statements this morning, because I have no desire to labor the committee with unnecessary words or repeat ground that has been gone over. I would like to say that, in my judgment, with the Pick-Sloan plan, when and if it is supplemented by what we call in this area the Young plan and the plan that was sent to Congress by the Secretary of Agriculture, we will have a well-balanced and well-thought-out program for the development of the resources of the Missouri Basin. I think that we have attained a high degree of coordination between the various Federal agencies which are involved in the development of our resources between the Corps of Engineers, Bureau of Reclamation, Department of Commerce, Department of Agriculture, Federal Power Commission, and all the various agencies of the Department of the Interior that are involved in the resources development in this area, and there are many that I need not mention, of course, to the members of this committee.

It is my judgment that under the Pick-Sloan plan, a plan for the development of resources in this basin, we are attaining the required and necessary degree of coordination to bring about the development of our resources, and I know of no substantial or well-informed criticism in the basin of the interagency committee at the moment, and it is my judgment that it is adequate to carry out the construction phases in the Missouri Basin. However, our first job in this basin is soil conservation. First, soil conservation for the sake of the soil itself. We must preserve our soil by the utilization of the best management practices that are known to man. We want to do that in order that we might maintain that soil, or in order that it might support us in this area and the people in America for whom we supply a tremendous amount of foodstuffs. We want to take care of that soil so that we may retain in that soil the maximum amount of soil moisture by preserving it. When I say "our first job" is to manage that soil so we maintain the maximum amount of moisture the Lord permits to fall upon it to produce better crops and then stop the runoff, I mean we can do it by proper soil-conservation methods. When we have done that, then we have retained in the soil the maximum amount of moisture possible by full utilization of these practices. We know in the springtime, when the snow goes down the Rockies, and when we have the heavy rains in the spring and fall, that we simply will not be able without proper methods to retain enough floodwaters to prevent them from gathering momentum as they go down the valley and into the main stream into the Missouri, to prevent them from bringing death and destruction to the city below. So, we know we must build some gigantic dams.

Under the Pick-Sloan plan we plan 105 of those dams of various sizes, some tremendous in scope. Of course, the work we are going to do in the Missouri Basin under the Pick-Sloan plan is the biggest undertaking of its kind in the world, and only the Russians are coming close to it on a project on the Volga River. When we impound the angry floodwaters, we will stop such destruction as we had in the Kansas area last July. When we impound these waters, we want

to put them to work for the benefit of mankind, make them work constructively rather than destructively.

I think the Pick-Sloan plan is a good plan. The Pick-Sloan plan needs the Young plan. It needs a stepped-up emphasis for soil conservation; and, as I see the Young plan, there are two important things. One is stepped-up conservation in our forests and our soils. That is broken down into two parts in the program submitted to you, gentlemen, but it involves a little over $2,000,000,000; about a billion and a half over the $3,000,000,000 that are asked for. Is that correct, Mr. Young? Then, in addition to that, there is the stabilization of small water courses. What do we mean by that? There is need for smaller dams on the small tributaries of these rivers where a tremendous amount of water gathers on some occasions, cloudbursts, and protracted periods of rain. There is a need for smaller retention dams, and that seems to be more properly in the province of the Department of Agriculture. You cannot expect the farmer to build it. It is too small for the type of work that the Corps of Engineers has been geared to, and it seems the proper place for it. Your committee is well familiar with the work done in Oklahoma and work done in Iowa on the Little Sioux. That work, in our judgment, needs to be extended.

So, I am interested primarily in those three features: soil conservation, conservation in our forest areas, and stabilization of the small water courses. I don't see any difference fundamentally or otherwise between the Pick-Sloan and Young plans. I think they dovetail. They are both necessary. So, I urge your committee to act favorably on the Young plan. Consider the two main things, plus the supplemental matters contained in the program, and I assume Mr. Young has explained to you that you consider the program carefully and that you act favorably and that you permit us to step up our soil conservation and water conservation, permit us a supplement in the Pick-Sloan plan. Let's keep our soil and silt back on the farm where we need it.

Last Friday I was in Kansas City, Kans., to address a realty organization. I spent 3 hours driving through the Armourdale and Argentine areas and certain other areas, whose names I do not recall, on the Kansas side. I have never seen anywhere in the world such utter desolation as exists in that Kansas City area today. I understand you have some of it right here in Topeka, a smaller amount of it, but in the same degree and just as painful for the city of Topeka. Block after block, mile after mile of the Kansas City area is gone. No life in it. A stray dog occasionally. Houses standing empty. A truck hauling muck off occasionally. Businessmen and citizens ruined, and maybe ruined for a lifetime, because it is hard to reestablish yourself in business when you have lost it all in one stroke. I say you will have that happen again in the Kansas City industrial area and in Topeka if you do not have a combined program under the Young plan plus the Pick-Sloan plan. And don't kid yourselves about it. If you don't flood some bottom land in Kansas, you are going to flood out and kill people and flood out the property in the Kansas City area. It is just that simple.

I am interested in what Governor Arn said. There would be great merit in the construction of a dry dam. As far as I am concerned, if the people in Kansas want to build a dry dam, I think that is their

business if they feel that it serves their purpose. But don't try to kid the people of the Kansas City area that it can stop the floods.

I think that is all, and maybe it is more than I should say to your committee. I appreciate the Young plan is costly, means a lot of money at times when we give billions all over the world. But for every dollar you invest in soil conservation and reclamation and development of the Pick-Sloan and Young plans I think America will have returned to it several hundred dollars; at least, that has been our experience in Nebraska, where in the North Platte Valley we have one of the oldest irrigation districts in America. We haven't paid for it yet. I think the payments are on schedule. But for every dollar Uncle Sam put in that North Platte Valley he has already taken out in tax and increased wealth several hundred dollars. So, this thing we are working on is a sound program. It is not a give-away program. It is a program to preserve and develop the resources of one-sixth of the entire continent of North America.

I appreciate your generosity, and if for any reason any of you would like to interrogate me I would be glad to attempt to answer the questions.

Mr. HOPE. Any questions on the part of the committee? We thank you very much, Governor, for your statement.

Next we will hear from Raymond A. McConnell, Jr., of the Lincoln Evening Journal, Lincoln, Nebr.

STATEMENT OF R. A. McCONNELL, JR., EDITOR, LINCOLN EVENING JOURNAL

Mr. MCCONNELL. Gentlemen, I am here to speak in behalf of the various watershed associations of Nebraska, in most of which—the Cass-Weeping Water, the Little Nemaha, the Big Blue, the Little Blue—I serve as a director by virtue of being editor of the Lincoln Evening Journal and Nebraska State Journal, which helped sponsor their formation. Particularly I am here to speak for the Salt-Wahoo Watershed Association, Inc., of which, with State Senator O. H. Liebers, a nationally known dairyman, I am cochairman.

The correspondence files of your chairman will show that from the time it was organized a year and a half ago our association has been anxious to tell you our story. We have been clamoring for a hearing out our way. This is because the shaping of a genuinely complete land and water use and development program for the Missouri Basin is of vital importance to all of Nebraska—the only State wholly within the Missouri Basin—and especially to the solution of our pressing twin problems of floods and erosion in central and eastern Nebraska. It is also because we are working in Nebraska and the Salt-Wahoo watershed to apply principles of land and water use and control upon which we know it is possible not only for the experts to agree but for the many seemingly divergent lay factions and interests, whose differences have retarded the protection of our lives, property, and natural resources in too many areas, to find common ground. Possibly today you have heard many who have chosen sides. That is too bad, because from an over-all standpoint there is only one over-all side.

The Salt-Wahoo watershed is an area of 1,655 square miles drained by Salt Creek and its tributary system, which drains into the Platte.

It embraces 5,000 farms, 135,000 people, parts of six counties, a score of villages, and the cities of Ashland, Wahoo, and Lincoln.

It is an area that in May 1950 suffered the worst floods in its history, and again in June 1951 suffered the worst floods in its history. The same was true throughout eastern and southeast Nebraska. Almost no community was unaffected. Twenty lives were lost the first year; three the second, and both years the toll in city and village and farm property, in tax-built roads and bridges and above all except life itself, in crop-producing land, was more than any community and any area, and particularly any area so utterly dependent on agriculture, can afford to have recur. What happened so tragically and spectacularly this year in Kansas happened less spectacularly but hardly less damagingly in the most fertile and populous parts of Nebraska, and happened 2 years in a row.

You are familiar with the pattern of damages in such disasters. You may be less familiar with the fact that on a less spectacular scale, but with a cumulative effect that is equally devastating, this toll is being taken month in and month out, year in and year out—by localized rains and floods that don't even make a headline. In a year when no floods were reported as such, one county of the six in the Salt-Wahoo area suffered flood damage of $25,000 in grading and regrading; $25,000 in graveling and regraveling; $7,000 in surface mainteance, and $135,000 in repair of culverts and bridges, or a total of $192,000. Repair of sediment damage to county roads cost Lancaster County $65,000 the same year. That is tax money.

In the Salt-Wahoo watershed, and in four other watersheds organized after the pattern of ours—covering a total of 30 of the State's 93 counties—we are working through organized watershed associations of local citizens to achieve all feasible protection against such losses. Since extravagence in conservation—whether of property or of resources—is a contradiction in terms, we are working for maximum protection at minimum expense. And in this effort we have discovered that the best of farmer-thinking—and the farmers have been doing a lot of thinking—and the best thinking of conservationists and civil engineers alike are pretty much of one mind on the basic principles by which such protection can be achieved.

By "we," I mean the upland and bottom-land farmers, the soil-district supervisors, the city property owners, the industrialists, the home owners, the city and village mayors and engineers, the county commissioners, the daily and weekly newspaper publishers, the bankers, the people at the top of the divide and the people at the bottom of the drain—all of whom are represented on the board of our association and of the associations patterned after it, including that of the most recent addition to watershed association ranks, that of the Marais des Cygnes, in Kansas.

Those basic principles are—

That what is planned and done on the streams must be coordinated with what is planned and done on the land.

That erosion control must be coordinated with flood control, since erosion is a large factor in flood damage, and siltation is a determining factor in the useful life of flood-storage reservoirs.

That what is planned and done on the rivers must be coordinated with what is planned and done on the tributary creeks and streams.

That this coordinate planning and execution, to be effective, must be on the geographic basis of natural watersheds.

Of course, since you can define a natural watershed as large or as small as you choose to regard it, we choose as our determining principle that the watershed on which planning is done on a coordinate, over-all basis should be however large as is necessary for a technically sound job of planning and engineering, and at the same time small enough to allow a maximum of local control and participation in setting the pace of the work and allocating the cost of upkeep.

The application of these principles, whether in the Salt-Wahoo watershed or in the Missouri River watershed, entails beginning at the beginning, where the rain first hits the ground. But to begin at the beginning doesn't mean to stop there. And, if through lack of foresight or understanding of the problem you happen already to have begun somewhere other than at the beginning, then you must go back and catch up with yourself as fast as you can.

The other day I took an all-day trip to the Little Sioux River watershed of northwest Iowa, with a party of Lancaster County soil-conservation district supervisors and extension-board members. We wanted to see for ourselves the progress that is being made in controlling floods and erosion in that area—principally because our area can profit a great deal from the experience there and the mistakes that have been made. The Little Sioux is a model for the program we have been working on in Lincoln only insofar as it recognizes that drainage ditches in the lowlands (there are 19 drainage districts in the Little Sioux area) are not the answer to a watershed's flood and erosion problems, but that the attack on these must begin higher up.

But in the Little Sioux that vital principle is being only partially applied. They are building their gully-checking and water-retention structures in some parts of the area before soil and water conservation is adequately practiced on the land above or understood by the upland farmers.

We saw an expensive reservoir—and corn being cropped, without contours or terraces, on the hilltops above it—which should have been in grass. It was the feeling of the Lancaster County folks that in our realization of the over-all problem and of the primary place of on-the-land conservation to protect these structures from siltation as well as to save the land, we are well ahead of the Little Sioux—even though we have no structures to show for it.

There, they are working at the middle, which is better than at the bottom end. In Lancaster and adjoining counties we are beginning at the beginning. The result will be slower but more sure.

The application of these principles as we are seeking to apply them in the Salt-Wahoo watershed means that you must control excessive runoff, and check the damage from excessive rainfall, at every possible point.

Specifically, as we envisage the application of these principles in our locality, this means—

Planning for our watershed as a whole, taking all these factors into account—in the planning stage. It is not enough, for example, to draw up two or more separate and unrelated plans and "coordinate" them by sticking a hyphen between them. The agencies doing the planning—and in our area this means the Soil Conservation Service

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and the Army engineers—must coordinate their thinking and calculations in the planning stage. In our area, incidentally—and uniquely in our area—they are doing this. They are doing it because we insisted on it.

It means an intensification of on-the-land conservation practices. This in turn requires not only stepped-up educational efforts on the part of such agencies as the extension service, but stepped-up technical service so that when farmers have the will to contour and terrace their land they will also have the way. It does not require expenditure of public money for nonpermanent improvement.

It means also the planning and construction of many small structures—gully checking installations, small retention dams, drop-tube inlets for the permanent solutions of the bridge-replacement problem, and so on.

It means the planning and construction of whatever larger dams and reservoirs are necessary, taking into account what can be accomplished in these other ways.

On this basis, I might interject, we expect no great trouble over the question of dams. Your controversy over dams tends to evaporate if your local people have reason to believe from the start, that no dams will be planned any bigger than is necessary, taking conservation into account, and that whatever dams are planned will have the longest possible life and take the least possible fertile land out of production. Farmers are reasonable—they only ask reasonableness on the part of Government agencies.

It means the planning and execution of whatever downstream improvement then is necessary to accommodate what water can't otherwise be held back where it is more useful.

To us, finally, this means the appropriation of Federal funds for construction of the larger structures, at least. Certainly in any of these watersheds where the floods originate there is a local interest. But certainly also there is a larger regional and national interest warranting Federal intervention. In our area we want to do what we can to protect our own property. But everything we succeed in doing also protects Kansas City, for example. The same is true on the Nemaha and Big and Little Blues, or any other Missouri tributary. There is an interest beyond any given watershed not only in the flood protection which action within that watershed can offer to property outside, but in the over-all conservation of our food-producing capacity as a nation.

At the local level the kind of job we contemplate in Nebraska requires creation of a new type of State subdivision—and a Nebraska legislative council subcommittee is working on this problem now. We are asking, and expect to receive, authority to create watershed districts, with powers to participate in the planning of coordinated flood and erosion control and to assume, and allocate among beneficiaries, the fair local share of the initial cost and all the burden of maintenance. Through such a device, we hope to retain in each given locality a certain say on the part of the local people as to how far and how fast and in what direction work should proceed.

This is the kind of job we are working on in the Salt-Wahoo watershed. It is a job we feel needs to be done on small watersheds throughout the larger Missouri watershed.

Because House Document 373 not only would do this ultimately in our own locality but would bring the entire Missouri Basin planning more closely in line with farmer needs and farmer thinking (and the thinking and needs of communities dependent on agriculture), one of our association's first actions, at one of its first meetings, at the State fairgrounds in Lincoln a year ago last July, was to adopt a resolution authorizing the spending of association funds to send a delegation to Washington to appear in behalf of the so-called Young plan, which is the label my newspaper gave House Document 373.

That was one of our first actions. But we grew tired of waiting on Washington. We have gone ahead, with money from a national foundation interested in the field, in the development for demonstrational purposes of a small subwatershed within our watershed.

One of our latest actions was at a meeting last August in Lincoln, attended on invitation of my newspaper, by 280 Nebraska and Kansas weekly and daily newspaper editors and publishers and watershed association representatives. At this meeting we passed a resolution urging that work of the sort envisaged in House Document 373 proceed without delay in small watersheds wherever the local people were ready.

I am submitting the text of a resolution, which has all the necessary "whereases" in it.

RESOLUTION ADOPTED AT KANSAS-NEBRASKA WATERSHED FLOOD AND EROSION CONTROL CONFERENCE, LINCOLN, NEBR., AUGUST 11, 1951

Whereas at this meeting assembled this 11th day of August 1951 at Lincoln, Nebr., there are assembled several hundred residents of eastern Nebraska and eastern Kansas, to discuss methods of flood control; and

Whereas the sentiment of the meeting is quite generally in agreement that the only sound approach to the flood control program is an over-all, coordinated, cooperative approach consisting of a sound soil and water conservation program on the tributary watersheds, combined with both small and large retention structures on the minor and major tributary streams, together with such major, main channel structures as are indicated to control water that cannot be controlled in small watersheds; and

Whereas there have already been formed and are being now formed many organizations on a small watershed basis which are prepared or will be prepared to utilize Federal assistance in the full development of their soil- and water-control programs: Be it, therefore

Resolved, That this body does therefore petition Congress to proceed immediately to make funds available to individual watershed groups who are prepared to utilize such funds to expedite progress and completion of conservation and flood-control measures within their respective watersheds.

In short, the people of this area are unwilling to wait for more floods while the Nation's political leadership is awakened to the problem. And we see no reason to wait on the other eight States' awareness of it.

We would have preferred, I think—and I speak only for myself—to have seen the whole job done right in the whole Missouri Basin. But as a matter of practical fact we cannot see how it can be done—on the principles I have outlined—except watershed by watershed, at whatever pace the farmers themselves can come to understand it and participate in it voluntarily.

So we want no delay—waiting for a sound program for the basin as a whole. The basin is made up of smaller watersheds, and its program will be sound as these are sound and add up, one by one.

At that same meeting in August to which I referred, there was laid the basis for organization of what is now the Kansas-Nebraska Watersheds Council. Serving with me on its board of directors are the following daily and weekly newspaper editors and publishers of the two States:

From Nebraska:

Fred Seaton, publisher, Hastings Daily Tribune, and president, Alliance Daily Times-Herald.
Arch W. Jarrell, editor, Grand Island Independent.
Ormond Hill, publisher, Kearney Daily Hub.
B. B. Rothenberger, editor, Beatrice Daily Times.
Robert S. Marvin, managing editor, Beatrice Daily Sun.
J. Hyde Sweet, publisher, Nebraska City Daily News Press.
Emil Reutzel, Jr., publisher, Neligh Weekly News.
Tyler Edgecomb, publisher, The Nebraska Signal, Geneva.
Marshall Howe, publisher, The Ashland Gazette.

From Kansas:

Ken R. Chappell, business manager, Manhattan Daily Mercury-Chronicle.
Bill Mayer, Lawrence Daily Journal World.
Whitley Austin, editor, Salina Daily Journal.
Oscar S. Stauffer, publisher, Topeka Daily State Journal and president, Stauffer Publications.
Ewing Herbert, Jr., editor, Hiawatha Daily World.
Marcellus M. Murdock, publisher, Wichita Daily Eagle.
Dwight Peyton, publisher, Overbrook Weekly Citizen.
Byron Guise, publisher, Marysville Weekly Advocate.
H. E. Turner, publisher, Waterville Weekly Telegraph.

I am not speaking for this council today, and never will, because it is not an organization for which anyone can presume to speak. It was not set up to propagandize any particular point of view. Its sole present function—to which these men and institutions are lending their personal and financial support—is in circulating reliable information on the problems entailed in flood and erosion control and on the efforts of people in the two States to solve them. It is sponsored by many newspapers whose many separate viewpoints I didn't even bother to ascertain—for the purpose of bringing the people of the two States and the people within each State closer together in tackling our mutual problems.

But although several points of view are represented on this council—composed as it is of newspapers each with its own community interest—I am not at all fearful that the upshot of its labors will in any way conflict with what the Salt-Wahoo Association and the Lincoln Journal are trying to do in our own locality. I am confident that the principles I have outlined, and to which the Salt-Wahoo Association and these other offshoot watershed associations of Nebraska are dedicated in their charters, will emerge from any exchange of informed thinking and any and every getting-together of seemingly conflicting points of view.

I am confident of this because they are the principles that have emerged from just such a bringing-together in our own locality—of upland and bottomland, top-of-the divide and bottom-of-the-drain, city, and rural, upland and bottomland farmer, farmer and business-

man. And they are the principles that have emerged wherever people have all got together to seek common ground.

They are principles that are noncontroversial in the very way they have been arrived at—in the bringing together of all possible interests and all points of view, and all the best engineering talent, to tackle the common problem at every feasible and economical point beginning at the beginning.

Our association is not anti-anything—except piecemeal and incomplete planning and execution, or either of these that overlooks or brushes aside local problems and local needs.

House Document 373, some have said, has many superfluous features besides watershed flood and erosion control.

I doubt that. That is I doubt if it is superfluous in any respect except that it tries to take in too much geographic territory at once. Certainly if our planning in the small watersheds that comprise the Missouri Basin is to be complete, it must be based on adequately intensified research and education, a many sided job, and those things we want farmers to do voluntarily must be adequately financed.

It is said, for example, that House Document 373, contemplates too much research. I am not fearful that we will err on the side of knowing or learning too much before or while we spend public money.

I am fearful only we will have inadequate technical knowledge. I am fearful only that we will know too litte, too late.

Nor am I fearful that Congress will err on the side of doing too much about our vitally important problems here in the Missouri Basin. Rather I am fearful that it will be too slow in realizing how vital this 10-State area is to the durability of the Republic, and that water and land cannot be managed, conserved, planned, or developed, except as they are considered together.

Gentlemen, that is all I have to say. I am submitting in writing a statement by our farm editor, Mr. Stanley Matzky, of what he feels, and I think he knows, to be farmer thinking throughout Nebraska on many phases of this subject.

(The statement of Stanley A. Matzke, referred to above, is as follows:)

FARMERS LOOK AT FLOOD CONTROL AND CONSERVATION IN THE MISSOURI BASIN

(By Stanley A. Matzke, Farm Editor, the Lincoln Journal)

Whatever the future holds—peace, war, or the in-between stage we are now experiencing—proper land and water use is the most important problem America will face for the next quarter or half century. We must protect and build up our agricultural production potential to be strong in case of war. We must do the same to meet the needs of an increasing population in case of peace.

As part of that land and water-use development the original scope of the Pick-Sloan project for the development of the Missouri Basin was and is of major importance.

But it is only part of a complete program of over-all natural resources conservation. During the past 10 years farmers on their farms have been doing things and asking questions. The thinking which has thus developed has impressed itself on the Missouri Basin program in the recognition of conservation as a vital first step in any water use or control program and the acceptance of on-the-land conservation being applied on the watershed basis.

This farmer-thinking has insisted on putting first things first—and the matter of first importance is growing crops and livestock.

We need the production of much additional electrical energy. But electricity will be of no value if our agricultural production is limited or destroyed by erosion, deterioriation, or floods.

River navigation offers definite advantages—if we have something to ship out and money to buy things to ship in.

Flood control is of vital importance—if approached as part of a program which will leave as much moisture in the ground where the rain falls and will leave our topsoil on the fields instead of allowing it to accumulate in useless depths behind dams.

Irrigation can do much for Nebraska and other Missouri Basin States if it is brought about on an economical, down-to-earth basis coordinated with other land and water-use and control problems.

This farmer-thinking was pointed up in the Missouri Basin comprehensive agricultural plan, commonly referred to as the Young plan, after Gladwin Young of Lincoln, under whose guidance it was formulated.

This plan has been effectively sidetracked by some politicians, private interests, and even Government agencies who view its public acceptance with jealous self-interest.

The Young plan's critics say it includes too much. That it should be confined to land use only. They object to its flood-control implications and aspects. They object to the inclusion in the plan of educational features, of REA (rural electrification) development, of phases which propose help in development of the program in the extension of adequate credit and Government aids to farmers involved.

These objections are not well founded to anyone who has studied the impact on local communities of the furtherance of land- and water-use programs.

Did you ever try to get a tenant capable of handling a good irrigated farm if you didn't have electricity on the place?

Can you conceive of a complete over-all water-use and control program which says that flood control is set apart as a completely different thing? Farmers studying the runoff from their lands can't.

How can you have a program of using all land and water resources according to the highest capabilities of the land without an educational program?

May I cite two examples of what I mean? Back in the 1930's some governmental agency decided that Milburn on the Loup River in Custer County was an ideal location for a canning factory.

And they were right. It had everything: Good land, available irrigation water, adequate labor supplies, transportation facilities, everything.

So they built a canning factory. At a cost, I have heard, estimated at around $40,000. It had everything. The latest and best in canning equipment. Complete down to an employees' toilet with tiled walls and pink toilet paper.

When the factory was completed they brought in a truckload of tomatoes from Omaha and had a dedication day. Five thousand people came—and each went home with a souvenir can of tomatoes they had seen processed. And that was the last canning ever done at the Milburn canning factory. Two years later the equipment was sold and the building now is a community hall.

The educational aspects of such a venture had been neglected—and it takes education to change corn—alfalfa—livestock farmers over to truck gardening even though it might be greatly to their advantage.

The other example I wish to cite is that of a county in Nebraska which has gone great guns in developing pump irrigation. Great quantities of easily accessible water lay beneath fertile soil on which crops suffered from the drouth. A few pumps sponsored by the extension service proved exceptionally successful. But pumps and land leveling and ditching cost money. Local banks were skeptical. A Government lending agency started the ball rolling. The banks said it would ruin farming by destroying the time-honored pattern of farm credit. Soon one bank got the idea and began to advertise for irrigation loans. "We'll loan you the money. You pay it back out of increased yields." The other bank called the progressive bank a lot of bad names and then fell in line and started to advertise for the same kind of loans. Today that county has somewhere around 35,000 acres under pump irrigation and agricultural production has been stepped up tremendously.

The Young plan cannot be justly criticized because as some state they added education, credit, rural electrification, research, etc. A critic once said that when the plan got to Washington, "They threw in everything, including the kitchen stove." If you've ever lived in a farm you will agree that the old kitchen stove is a very necessary part of farm activity.

Farmers are also insisting that such a program of common-sense water and land use and control be speeded up—and that it be accomplished economically and to the greatest extent possible in accordance with local needs, and under local control.

Nebraska has every acre in the State within the area of a local soil-conservation district. And in every district the stack of applications which the soil-conservation district supervisors and their SCS technicians have not been able to attend to is growing by leaps and bounds. I've seen SCS technicians using flashlights to run terrace lines at night. In Lancaster County 300 applications for farm plans are untouched because of lack of money to hire technical assistance. Six hundred and ninety-four farmers with partially completed plans are demanding help which the meager staff can only supply in a limited measure.

Farmers are asking if there is not too much emphasis on the incentive payment program of PMA and too little on the technical assistance program of SCS. The former in the current budget will carry appropriations of about $250 million, about five times that of the money available for the latter.

In one area of Nebraska, 800 miles of terraces were built with but 300 miles receiving PMA payments. After PMA money ran out last fall terrace and grass waterway building in Nebraska went right along just as fast as the SCS staffs could get time to run the lines.

Farmers feel that some of the practices for which payments are made are not true conservation. They question the Government paying for practices which return an immediate profit and which do not have a long-range conservation value. Many farmers are bulldozing out dams built with Government payments and replacing them with grassed waterways supported by terraces, contour tillage, strip cropping, and other conservation practices. Thousands of these badly designed and misplaced dams in my State have silted full, washed out, or have been replaced with other more effective conservation, including properly constructed dams with drop tube protection and adequate spillways. But improperly designed dams are still being built with the aid of Government payments. Present coordination plans of the USDA for PMA and SCS are not yet doing the job and farmers can see millions more wasted that are badly needed to further a sound conservation program.

In keeping with the local thinking watershed associations like the Salt-Wahoo Watershed Association at Lincoln are organizing in many parts of Nebraska. Their program is a triple-trinity one the objectives of which are: (1) Conservation and erosion control, (2) flood abatement, (3) recreation and wildlife development. To be attained by a threefold program of: (1) Education and demonstration, (2) planning and survey; (3) execution. To be applied to the watershed in a three-phase development: (1) On the lands of the watershed, (2) on the small tributaries, (3) on the main streams.

And they want this small watershed program coordinated into the Missouri Basin development plan with the following priorities as to water use in mind: (1) The first use for water is to grow crops and recharge ground-water supplies; (2) to supply water for irrigation where runoff and subsurface waters can be feasibly and economically put to that use; (3) for production of power where that use does not interfere with the above first two uses; (4) where additional steps are necessary in addition to the above to guard against flood damage, then provide such storage as is necessary but which will destroy as little good land as possible; (5) if, when the other four objectives have been attained, there is anything left for navigation, then let's have navigation.

Mr. HOPE. We thank you very much.

The next witness is Ray Wegner, Ozawkie, Kans., representing the Kansas Soil Conservation and Flood Control Association.

STATEMENT OF RAY WEGNER, REPRESENTING KANSAS SOIL CONSERVATION AND FLOOD CONTROL ASSOCIATION

Mr. WEGNER. Fellow committee members, ladies and gentlemen. It is indeed a pleasure to have this committee come to Kansas for this reason, that it has been the experience of farmers in the past that if they were to go to Washington and appear before a congressional committee they would say before they even started, "What is the use?" So I am glad that you fellows are here to hear us farm folks. I want

to tell you personally that there was a reason for starting watersheds in Kansas, and I myself am probably the one that is responsible for that. I started thinking of watersheds or starting to find an answer to flood-control or flood-prevention problems long before this 1951 flood. Ihad read considerable about the district of Ohio, and Miami, and had read a lot about 11 of the congressional projects, such as the Washita and Little Sioux. I thought there was a solution to our problems in Kansas, and living in the Delaware watershed I felt there should be an answer to our problem.

I will ask you gentlemen to turn around and look back of you upon the map up there. There is the Delaware River watershed in its entirety. We have worked on the soil-conservation districts, our water resources, division of our State, and we have come up with those divisions dividing that watershed into 12 districts. Thus far we have had meetings over this entire watershed. Eight of these districts are already organized. Four are left to be organized in the very near future. Over this over-all picture over the entire watershed, the organization is to be a nonprofit nonpartisan corporation, being organized under the corporation laws of the State of Kansas. That in turn is to be a legal organization. That is the original plan and that is the plan that several watersheds are following in the State of Kansas. Last August Dr. H. H. Bennett, chief of conservation at Lincoln, Nebr., gave in his speech, and I quote this part:

> We believe that coordination of river control and a watershed program was the intent of Congress when it passed the Flood Control Act of 1936.

We believe it is still the intent of Congress, and we don't believe that Congress intended one program to be in any sense a substitute for another, but rather they should be complimentary parts of a single job of the Flood Control Act of 1936, and subsequent acts supply all authority needed by the Department of Agriculture and Corps of Engineers in working together and in planning and carrying out a complete program in alleviating flood damage. Such control, as we see it, involves three principal types of operation, the land treatment, upstream control, and downstream control. You have had some figures and reports this morning which deal in land treatment. There has been a lot of heated argument in the State since the July 1951 flood and comment on the downstream control part of that program. There has been very little said or done in behalf of the upstream control, and that is the thing that I hope we will bring into the upstream control work by this watershed plan, because it is a plan that we farmers, the people of the watershed itself must work, together with the Corps of Engineers, and Federal and State agencies. When that is done and the people will realize we must work together through joint efforts, we will get some place.

I wish to file with you gentlemen articles from several newspapers which tend to show the need and necessity of watersheds in Kansas to alleviate this flood problem.

(The following letters and articles were submitted by Ray Wegner:)

HOLTON, KANS., *October 31, 1951.*

Re watershed treatment program versus Pick-Sloan plan for big dams.

SUBCOMMITTEE OF THE HOUSE COMMITTEE ON AGRICULTURE,
Washington, D. C.

GENTLEMEN: Flood control is in the minds of everyone residing in the Kaw River watershed. After witnessing what happened during May, June, and July

of this year, most folks feel that something should be done at once to prevent a recurrence of that catastrophe.

I am located in the Delaware River watershed, so am vitally interested in what will be done here. My neighbors and I have endeavored to inform ourselves as to what could be done and have fairly unanimously agreed on what should be done.

It is our opinion that controls should start where the rain falls. The usual soil-conservation practices should be used to keep as much of the water in the soil as possible. The unavoidable runoff should be retarded by terraces, diversion ditches, and detention dams. Every effort should be made to prevent erosion. Properly placed farm ponds and gully plugs will eliminate some of the runoff, and with plenty of detention dams in the smaller streams to release the water slowly, the main streams will have very little overflowing.

If the Perry Reservoir, advocated under the Pick-Sloan plan, were to be constructed it would take out of production—and taxation—some of the finest land in the entire watershed. The cost of the Perry Reservoir would be far more than the cost of the watershed treatment program for the entire Delaware River watershed. We doubt if the reservoir plan would exceed, if equal, the benefits of the watershed program for points below Perry.

On the other hand the watershed program would benefit the entire watershed by curtailing erosion; additional storage of water; less damage from either floods or drouth, thereby increasing the productivity of the land; providing more stock water; probably raising of the underground water table; and eliminating the upstream damage usually occurring above reservoirs caused by backwater sedimentation.

Respectfully submitted.

LLOYD M. LUECK.

HOLTON, KANS., *October 30, 1951.*

SUBCOMMITTEE ON MISSOURI VALLEY UPSTREAM FLOOD CONTROL:

In making a statement to this committee I know we are faced with a gigantic task to control floodwaters in Kansas. In the controversy over how to do it I think too many other things have entered into the picture such as downstream navigation, furnishing power, recreation, and irrigation. Would it not be better to think of just flood control or maybe we should call it water control.

In considering the large dams that have been proposed maybe a couple of incidents that happened in our county will help. Two small towns in our county built small lakes in 1934 with WPA funds. The lakes were 3 to 5 acres in size with a drainage area of 300 to 400 acres of land. About one-half of this land was plow land and not protected by terraces or anything to prevent the soil from washing. One lake now is filled with silt and not a drop of water in it. The other lake is about three-fourths filled with silt. I believe the same thing would happen on a large dam if we built it now without any protection above. We can all see the tremendous amount of silt and sand deposited on the overflow lands this year.

Any farmer knows that when he is going to control the water on his farm he must start at the top of the hill and work down. The same thing will have to be done in order to control the water in any river basin. Go to the very source of all of the little streams and start controlling the water and go as far down the rivers as it is necessary to stop them from overflowing.

This fall the SCS technicians and the county PMA committee of Jackson County, of which I am a member, were asked to make a survey of a small stream in our county for control of water on it. There are 16,112 acres of land in it, 10,691 acres of cropland, 3,645 acres of grassland, and 1,750 acres of woodland. It needs 271 miles of terraces, 1,410 acres more of grassland, 45 farm ponds, 2 miles of field diversions, 53 erosion-control structures consisting of 125,000 cubic yards. This will apply to most of the watershed in eastern Kansas and will be what we need to control floods.

HARRY V. MOORE, *Muscotah, Kans.*

LETTERS SENT TO THE WORLD BY SUBSCRIBERS

EDITOR, HIAWATHA DAILY WORLD:

The writer has read the startling figures submitted to the World by Mr. Parker, of the district soil-conservation service, showing the quantity of soil

deposited at the Hiawatha Lake Park in the few years since its construction. While these figures are, doubtless, mathematically correct, there is one fact, however, which Mr. Parker failed to note.

That is the fact that not all the soil particles carried in the moving water were left at the lake site. A considerable portion, unknown tons in quantity, was carried over the dam to find its way into Wolf River, the Missouri, the Mississippi, and, finally, into the Gulf of Mexico. Some is scattered over the mud flats of these rivers, some found its way into the homes and offices of the flooded area of Kansas City. This addition to the facts as stated by Mr. Parker only adds to the seriousness of the picture.

In the interest of the national welfare these facts, so interestingly told by the reporter for the World, should be reprinted in all the leading newspapers and magazines in the United States as a concrete example of the soil losses being suffered. This fertile topsoil, the slow accumulation of countless centuries, is the greatest single asset of the American people—in fact, greater than all others combined. To prevent its loss, never to be replaced, to keep it as a heritage for posterity should be the concern of every citizen.

H. S. MILLER.

A CONSERVATIVE SILTING STUDY RIGHT AT HOME

The vital need for a more general application of soil-conservation practices is clearly demonstrated in a "right here at home" story—the saga of the decline and almost total extinction of the body of water at the Hiawatha Lake Park. George Parker, who has been connected with the Soil Conservation Service here for the past several years, is a statistically minded chap and has dug up some figures on this particular incident of siltation which seem almost unbelievable but which are, actually, extremely conservative.

Emphasizing that it is Parker speaking and not the Conservation Service, George tells the tale of ruin much in this manner:

The drainage basin for this body of water contains, in all, some 500 acres of which 375 are in tillage and 125 in pasture and timber land. Since very little silt is washed away from pasture-and-timber-protected soils, the culprit in this case must be assumed to be the 375-acre cropland area. This area, Mr. Parker notes, is land with soil classified as Sharpburg and Carrington with a 5-percent slope, soil regarded as highly erosive unless protective measures are practiced. In recent years work of this nature has been done but for the majority of the years since the lake was dedicated back in the deeply depressed thirties siltation from this cultivated land has been uncontrolled.

According to careful calculations made by the conservationist, the silt deposit which has accumulated in the water since the big pond was established amounts to 47,500 cubic yards of topsoil. To the average laymen this will represent just a big figure and not much more, so George has broken it down into comparisons that can be readily visualized.

This amount of earth, the Parker pencil has worked out, represents 11,850 truckloads of 4 cubic yards each. To go a step further and convert to pounds, water runoff has carried 132,720,000 pounds of the good Brown County land into the reservoir. More mathematics reveals that this boils down to 66,360 tons.

The average railroad car, Mr. Parker points out, carries 80,000 pounds of 40 tons, so the silt on hand today is the equivalent of 1,658 railroad car loads or 20 trainloads of 82 cars each. That's a lot of dirt, folks. But when one considers that, when the park was dedicated, it was 24 feet from the top of the spillway to the bottom and last week it was only 4 feet the computation becomes more understandable.

(NOTE.—To illustrate that George's figures are conservative, it should be stated that all his computations are based on an average depth of 6 feet of silt over an original 5 acres of water surface.)

Now for a look to see what happened to the cultivated land during this period under inspection. The 47,400 cubic yards of soil which have shrunk the body of water to a fraction of its original size boil down to 126.4 cubic yards from each of the 375 acres of cultivated land in the watershed. Another step in calculation shows that this amounts to nine-tenths of an inch cut off the top of the fertile soil of the drainage area.

There is little doubt, the soil man believes, but that very similar erosion has been going on all over Brown County although actual demonstrations such as the one in the foregoing study are, obviously, impossible. In this county 69.9 per-

cent of the land or 258,519 acres represent cropland. Assuming that each of these acres lost 126.4 yards of topsoil during the past 18 to 20 years, the erosion loss would add up to the staggering total of 32,676,801.6 cubic yards.

Just for the heck of it, George has converted the figure to pounds and arrived at a total of 91,495,042,800 of them, a number that compares very favorably with a week's expenditure in dollars by the Federal administration. In tons the lost land would weight 45,747,521 or would load to capacity 1,142,688 railroad cars, the equivalent of 11,437, 100-car trains of farm land. George intended to foot it up for the entire State of Kansas but said that after arriving at the above amounts, he was too dizzy for further calculations.

In the light of the foregoing statistics, all clearly demonstratable and consisting of nothing but cold, hard facts, it is well night inconceivable that any farmer or land owner in the county should neglect to take full advantage of the aid offered freely by the Soil Conservation Service. And yet, Mr. Parker stated, only about 50 percent of the farms in the county have made application for farm saving plans and these plans have been completed on only a fraction of that number.

[From Topeka Daily Capital, October 3, 1951]

Flood Groups Plan to Unite—State Watershed Association Is Aim

First step toward formation of a State-wide watershed association to formulate a comprehensive flood control and soil conservation program was taken Tuesday by the executive board of the Kansas Soil Conservation and Flood Control Association.

Representatives of flood control groups throughout Kansas approved a resolution directing the association president, Ray Wegner of Ozawkie, to appoint a committee to draft articles of incorporation for a nonprofit corporation.

Purpose of the proposed corporation will be to promote and coordinate formation of local watershed districts on every Kansas stream, according to an announcement by Wegner.

PAYTON HEADS COMMITTEE

Dwight Payton, Overbrook editor and leader of the Upper Marais des Cygnes watershed, was named by Wegner to head the State-wide committee. Other members will be announced later.

Wegner said the proposed corporation will seek flood protection and soil conservation "through any and all means." He outlined a three-phase operation based on soil treatment, upstream engineering, and downstream structures.

Wegner said the corporation will attempt to coordinate plans and activities of the Soil Conservation Service, Bureau of Reclamation, United States Corps of Engineers, State agencies, and local drainage and watershed districts.

URGES "TOTAL" PLAN

Wegner urged all Kansas residents to join in developing a total flood-control plan which will include soil-saving techniques developed by the United States Department of Agriculture.

Tuesday's action followed several days of stepped-up soil conservation and flood control activity. Residents of the Blue River Valley voted Monday night to form a watershed district. A Marais des Cygne district was formed last week. President Truman last week asked Congress for a supplemental appropriation to finance a watershed control program on the Delaware River.

MEETING AT CAWKER CITY

J. T. Heinen, Cawker City insurance man, also announced Tuesday that a watershed district is being considered for the Solomon River, another tributary of the Kaw.

Heinen said that a Solomon Valley flood control and soil conservation meeting has been called for 7:30 p. m. Wednesday at the high school auditorium in Cawker City. More than 1,600 residents of the Solomon River Basin, including tributary streams, have been asked to attend the meeting.

[From Lawrence Journal-World, October 4, 1951]

By All Means

The organization of a Statewide watershed association is contemplated, and it should be a useful adjunct to the associations that are being set up in the different watersheds of Kansas to take action for flood protection.

While details will differ in each watershed, much of the findings in general research on the subject will be of common benefit, and having a central organization to do it would prevent useless duplication of effort.

The individuals and organizations behind the planning for this project are seeking flood control "by any and all means." They are keeping clear of the folly of trusting to a single panacea. It is evident that they saw the 1951 flood. The best contributions of every method of control that is known will be required to reduce the destructive power of a flood like that.

[From Wichita Beacon, October 5, 1951]

Kansas Flood Groups Are Brought Together by the Recent Disaster and Its $2,500,000,000 Loss

Faith in the strength that is created by unity and what can be accomplished by unified effort have brought together two organizations that are working for further Kansas development, and welfare and safety of the State's citizens.

The groups are the Kansas Soil Conservation Association and the Kansas Flood Control Association. Henceforth, they will strive together for common ends.

In uniting, the two associations have taken a forward step toward a Statewide and comprehensive soil conservation program and effective flood control.

In a Topeka meeting they have opened the way for action by approving a resolution directing the appointment of a committee to draft articles of incorporation for the proposed nonprofit organization.

The leaders in the movement are taking a long-distance view of Kansas needs regarding soil conservation and flood control. It is a long-range plan they propose to formulate.

One need, as defined at the Topeka meeting, is watershed districts on every Kansas stream.

The plan for Kansas safety from floods is for a three-phase operation. It would have to do with soil treatment, upstream engineering and downstream structures.

Kansas citizens, as the new corporation urges, should take an active part in the huge developments at which the new organization aims for the benefit of this State and its every citizen.

[From Oswego Democrat, October 12, 1951]

Your Kansas Legislative Report

(By James L. Robison)

Topeka—Kansans currently are giving a beautiful demonstration of cutting their own throats in the matter of flood control.

Almost everyone in the State agrees that flood control is needed. A large number of them are freely giving of their time and money to promote an early start on the problem. They are convinced that now is the time for action.

Still these men are hurting the State and driving flood control farther and farther from its borders.

Since the July flood, interest has centered on two methods of achieving control of the State's rivers—big dams and levees, or soil conservation and small retention dams. Each method has its champion and each has a wealth of statistical information to back up its claim as the solution to the State's greatest problem in 20 years.

Led by Kansas City industrial and business interest, the big dam supporters have been active throughout the State and in the Nation's Capital since the July disaster. Until the past month, they definitely have had the loudest voices

and the greatest following. The main argument follows the propaganda line furnished by the United States Corps of Engineers that only a series of big downstream dams could hold floods of the size Kansas rivers have been generating.

Supporters of upstream retention dams and soil conservation have been slower getting organized. But in the past month, the watershed concept of flood control has gained converts at an amazing pace.

Farmers are taking to the watershed program because it promises returns for both upstream and downstream residents. Also, it takes care of the people who generally are left helpless above the big dam sites.

All of this activity for flood control would be most welcome if it were directed solely toward achieving the program advocated by each side of the dispute.

But this is not the case. The big dam supporters are devoting at least half their time and money to preventing watershed control. And the watershed groups consider their program a substitute for the big dams.

The result so far has been merely to confuse Congress. As one one Congressman put it: "Congress doesn't know what the people of Kansas want, and it has no way of finding out."

Eventually, the lack of unity on flood control may leave Kansas at the mercy of its rain and rivers without defense of any description. That may please some people, but it won't save the soil and prevent floods.

Obviously a compromise and a united front for a comprehensive flood-control plan must be worked out. If the fear of a Missouri Valley Authority was able to scare the Army engineers and the Bureau of Reclamation into a united front for Pick-Sloan, then surely the fear of another great series of floods can scare the people of Kansas into a united front for a comprehensive flood-control program.

Such a program, of necessity, would include both watershed treatment and big reservoirs. It would be up to a group of competent, unbiased engineering experts to decide how much watershed, and how many big reservoirs.

That the two methods of flood control are not incompatible is obvious. Each is designed to do a particular job—watershed treatment attempts to stop big floods before they form; big reservoirs attempt to contain water runoff after the floods have formed and are out of reach of watershed prevention measures.

Up to now, there has been no indication that a compromise is in the making. Rather, the contrary is true. The fight is becoming more vicious and deep-rooted every day.

The only hope is for leadership to be provided by someone, or some group, of high standing with both sides. It is difficult to admit, but true, that Kansas does not have one leader, or group, with that much stature. There is no one to whom the whole State can look for guidance.

It is a situation which calls for dynamic leadership by a man, or a group, with vision and courage. The future of Kansas for years to come depends on whether or not the State can find that leadership and face the flood problem and produce an answer.

[From Lawrence Daily Journal-World, July 24, 1951]

K. U. Engineering Professor for a Retention Dam System

A member of the flood control advisory committee to the Kansas governor today denounced the proposed system of reservoir dams on the tributaries of the Kansas River and advocated a system of small retention dams.

Prof. J. O. Jones, professor of hydraulics at K. U., told the Journal-World that Tuttle Creek Dam and the others like it proposed by the Corps of Engineers "won't do the job."

"We don't need big dams," he said. "Instead of spending 68 million dollars on Tuttle Creek Dam to protect the people in the lower Kaw Valley, we need to spend 1 million dollars on each of 68 small retention dams at the heads of the Kaw River tributaries and protect the whole valley.

"It's time we started worrying about the entire valley, the people on the little streams that get floods every year instead of just looking at the people in a major disaster that happens only once maybe in 15 years. We must not forget towns like Marion, Valley Falls, Marysville, and Waterville."

He added that Tuttle Creek Dam would probably be built because public pressure would demand that something be done immediately.

He pointed out that one of the most successful flood-control projects is the Miami Conservancy, which is a series of retention dams on the Miami River above Hamilton, Ohio.

"Tuttle Creek Dam would not have averted this disaster," Jones declared. "This was an unprecedented storm. We already had received a nearly record amount of rainfall in June. If all the proposed reservoir dams had been built, they would have been filled by June rainfall by the time these last disastrous rains hit them. The spillways would have been discharging water more rapidly than the river banks would have carried it, and we would have had this flood."

For support of his statement, Professor Jones, who was acting dean of the K. U. engineering school from 1942 to 1948, cited the Kanapolis Dam.

"A 5-foot overflow occurred between Marquette and Kanapolis during this current flood and Salina has received two major floods since Kanapolis Dam has been completed. This shows the Kanapolis Dam is not what it was cracked up to be."

The hydraulics engineer did say that he felt nothing could have averted this flood, however. "Engineers would call this a 100-year flood, meaning that it would happen only once in 100 years."

He continued by saying that the Corps of Engineers are making predictions which future history will prove grossly wrong. "Hundred-year floods happen infrequently, but it is impossible to predict at present when another flood is coming.

"When a flood which will top the 1951 flood will occur is impossible to tell," Jones said. "The Corps of Engineers is merely guessing when they make their predictions. Our records on floods are only about 40 years old. When the records are 300 years old, we'll be able to make predictions on floods and may be able to tell when the next flood is coming and how big it will be. Until then any engineer who says a dam will handle such and such a flood is putting himself out on a limb."

Retention dams are better than reservoir dams, Professor Jones contends, because they are not kept full, but are used only when when the river begins to rise. This allows more space for the water and also keeps the dams from filling up with silt. A steady current through the dam keeps washing the silt down.

"Another reason it is better to have retention dams which are put into use as storage facilities only in floodtimes is that more land can be farmed around the dam," he declared. "Of course, no one lives within reach of the retention dam waters, but farmers can lease the land to farm. Nine years out of ten they will probably not be flooded. This allows more of the fertile river bottom farm land to be farmed than if the fertile river-bottom land was kept covered by reservoir-dam waters.

'The Corps of Engineers wants multi-purpose reservoir dams because they can heap intangible benefits onto the water, such as wildlife conservatory, recreation, and the silliest reason of all, improvement of navigation on the Mississippi River below St. Louis," he said emphatically. "This allows them to overestimate the benefits and thus build bigger dams."

He attributed what he considers a major fallacy in the Corps of Engineer's principle to the 1927 act of Congress. The law only specifies that the benefits exceed the cost. To Jones, this is a mistake. He believes that the projects should be planned so that the difference between costs and benefits is greater than the cost. In other words, so that benefits increase at a faster ratio than the cost. "Privately financed projects are planned this way, why shouldn't Government projects be the same way?"

[From Clay Center Dispatch, September 14, 1951]

THE STORY OF THE KANSAS FLOOD OF 1951—WHAT DOES IT MEAN?

(H. H. Munger, Kansas State College faculty member and licensed civil engineer)

We have just experienced the greatest flood that has gone down the Kaw Valley in 107 years. It might have been worse, very much worse. If the rainfall of July 10, 11, and 12 had been located 100 miles farther north, the flow of the Kaw might have been somewhere near double what it was. We should reverently thank God that the heaviest rainfall was on the divide between the Neosho and Kansas watersheds, but we should remember that the next time it may be on the Republican-Blue divide so the Kaw will catch it all. Then what?

If we turned the whole Blue Valley from the Nebraska line to Manhattan, and the Kaw Valley from Junction City to Kansas City, into a series of reservoirs it would not hold what such a storm could send down the valley.

Then what can we do? We can go up onto the hundreds of tributaries and catch them before they get big. If we control the tributaries we have licked the big river. In doing that we do two jobs at once. We protect the river valleys and creek valleys, too. In the watershed of the Big Blue alone, there are at least 200,000 acres of productive land upstream from the proposed Tuttle Creek dam site that are subject to damaging flash floods. Similar conditions exist on the Neosho, the Solomon, the Republican, the Marias des Cygnes, and all the other rivers of Kansas, Nebraska, and Missouri. Over a long period of time the total damage by flooding of these tributary streams is greater than that done by the main streams in their more spectacular, but less frequent floods. Water is just as wet in York, Nebr., as it is in Kansas City.

Besides, the proposed big reservoirs would not have protected Manhattan, Topeka, Lawrence, and Kansas City from this year's flood. Water does not run uphill. The flood of 1951 originated downstream from every proposed dam of the Pick-Sloan plan. To have a protected valley this year would have required at least one reservoir on each creek from Lindsborg to Lawrence. Careful measurements shows that Clark Creek, which empties into the Kaw near Ogden, was discharging something more than 24,000 cubic feet per second; a bigger stream than the Smoky Hill at Ellsworth. Lyons Creek, 20 miles upriver, was running something near the same amount and McDowell Creek, the next creek below Clark, was flowing at least 10,000 cubic feet per second. There was a total of something close to 60,000 second-feet, one-third as much as the 1935 flood of the Kaw at Ogden, all coming out of three creeks that are so small that the men who were going to "flood proof the valley" never noticed them.

During the months of May and June, rainfall throughout most of Kansas was from 130 to more than 250 percent of normal. This resulted in considerable flooding of all streams during June. The report of the United States Weather Bureau for Kansas for the month of June, issued July 6, states: "Rivers in the north and east rose to disastrous flood stages and for the most prolonged period on record, especially in the Kansas Basin."

It is logical to conclude that any reservoirs would have been full as was the Kanopolis Reservoir. On top of this rainfall, which had continued for more than 2 months, from 8 to 15 inches of rain fell throughout the east central part of Kansas on July 9, 10, 11, and 12. This latter rain belt was essentially below the site of most of the reservoirs built or proposed. Consequently, the effect of such reservoirs on the runoff which caused the devastation would have been extremely limited.

Don't let anybody kid you. We will never flood-proof the valley. When it rains 18 inches in a day or two, as it does once in a while, there is going to be a flood. But if we provide each tributary with detention dams that can hold back a runoff of 6 inches and let it drain out gradually, so much will be taken off the crest of the flood that nobody will be badly hurt except those folks who insist on building their houses right in the river channels, and, after all, is it the responsibility of the taxpayer to protect the individual who knowingly locates his home or his factory in the river channel? If a man goes to sleep on the railroad track and is run over by a train, the courts hold that the railroad company is in no way responsible. The fault was in the man who was so foolish as to choose such a dangerous bed. Wouldn't it be the part of justice and common sense to apply the same principle to the case of the man, or the corporation who builds a home or a factory in the river channel?

[From Topeka Daily Capital, September 30, 1951]

GOAL OF WATERSHED DISTRICTS IS TO PREVENT FLOODS BY HOLDING BACK RAIN WHERE IT FALLS

(By Dwight Payton)

When the Kaw River went king size last July it left eddies and currents in its flood wake that, if properly directed, can make the great disaster something of a blessing in disguise. Looking at North Topeka, Manhattan, and the other ravaged areas, it is difficult to conceive that this wreckage and the hardship and suffering it brought contain the seeds of a great blessing. But the seeds are there and need only be nourished and cultivated to produce their fruit.

We have the promise, but fulfillment is not just going to happen—it is up to the people of the Missouri Basin to make it happen. The key is in the phrase of the above sentence, "if properly directed." Obviously, the first step is to prevent recurrence of the flood. The will and determination for this is a great force in the Nation today.

It is harnessed and pulling in three different directions with three major plans of flood control competing for acceptance—the Missouri Valley Authority, the Pick-Sloan plan and the watershed treatment program.

PROMISE OF GREATEST GOOD

It is not the purpose of this article to argue against, but rather to explain the plan the author believes to be the one that holds greatest promise for greatest good. We believe the watershed approach is that one.

Interest in this program is gaining by leaps and bounds. It advances by the sheer power of its own logic and rightness and even has about it something that inspires nearly a religious zeal.

First, let's examine the background and mechanism of the watershed treatment program and define its operation. It is relatively new in Kansas, though not so new but what three major watershed districts—the Upper Marais des Cygnes, the Delaware, and the Blue Valley—have been formed, along with a number of smaller ones.

DIKES' VALUE LIMITED

Every river, in effect, has three beds, the one at the bottom of the valley which carries the normal flow of water, a secondary overflow bed between the bluffs which fills in overload periods as happened last July, and finally, the valley itself which catches the rainfall and slopes it on its downward way.

The earliest idea on flood control was the elemental one of dikes to hold the water from spreading out of its primary bed. Dikes make sense, but only when the weather will cooperate to keep the ratio of rainfall in line with the height of the dikes. An air survey from Kanapolis to Kansas City at the peak of the flood showed only ripples to mark the dike lines.

Thinking for flood control progressed of necessity from the primary-bed dikes to secondary-bed dams through the last 30 years and ever bigger dams were proposed. This evolution climaxed in the Corps of Engineers' Pick plan and Bureau of Reclamation's Sloan plan, and MVA forced a shotgun wedding of the two in 1944, to give the present Pick-Sloan plan.

PREVENTION IS OBJECTIVE

Evolution of thinking went beyond the big dams to consider flood control in the third-stage river bed, the watershed of the valley itself. While the big dam boys are still thinking in terms of controlling the flood after it happens, watershed proponents are suggesting that it be prevented from happening at all. To do this it is necessary to retard runoff on every acre of land, impounding and slowing over a period of time sufficient to allow the primary bed to do its job without serious overflow.

What is there on the uplands that will impound water? Dr. Hugh Bennett, United States Chief of Soil Conservation speaks of "the reservoir of the soil" as the start. Had the soil all been properly conditioned it could have held up to 10 percent or more of the big floods. So, soil conservation practices become a part of the watershed program.

Good farming practices—that is the first point of attack. This also includes, in addition to putting more sponge in the soil, the process of terracing, construction of small, continuous dams on sloping fields. Terraces do three jobs—impound small quantities of the runoff water, slowdown runoff speed, and check erosion. Again there is multiple benefit in soil saving and flood control.

RETENTION DAMS

But there comes the time when even the richest earth is soaked to capacity and the terraces are running full—and still it rains. The watershed plan has yet another answer to "preventing" the flood from forming—the retention dam.

Up in the hill regions of any watershed there are literally thousands of sites for small dams. Say we build one across a draw above Soldier Creek or up in the Wakarusa Valley. First an engineer surveys the drainage area to compute the maximum runoff to be expected, according to known rainfall records. This

measurement is made in terms of "acre-feet of water" which is about what is sounds like, an acre covered with a foot of water.

With a slide rule the engineer can tell you how high a dam will be needed to impound the water of, say a 5-inch rain. Build the dam and we have a permanent pond. Ponds have only a small value in flood control because they are apt to be all or part full when the heavy rain comes, so something more is needed.

Suppose our engineer computes the size of the dam for maximum flood and plans to release a small volume of the water, limited in quantity to prevent flooding below. He can do this with an automatic draw-down pipe or riser, which is nothing more than a pipe through the dam at the desired level and of the desired size. If the pipe is placed at the bottom of the dam the water runoff of the area above will be impounded behind the dam and slowly fed out through the pipe, restoring retention capacity and leaving the reservoir dry in a matter of hours or days. This is the principle of the dry dams. With our retention dam functioning, no flood has occurred at this point because the waterways below can carry the volume released over the given period of time.

Farmers ask, can we have stock ponds along with flood control? The answer is definitely, yes. Put the draw-down pipe through the dam at a height of 6 or 8 feet and it will feed out the water until it reaches that level, then leave a permanent reservior covering several acres.

FARMERS LIKE METHODS

Farmers like the watershed treatment method and turn to it by instinct even before fully understanding its various phases. When told that the small retention dams are built in the waste areas of draws and gullies so that no valuable soil is taken out of production they like it even better.

City folks have an interest in the soil, too, greater than most realize, and they too, should appreciate that point. There is no destruction of land in the watershed program, only land improvement. Moreover, the on-farm supply of water is greatly increased, and water and soil are inseparable partners in the enterprise of growing crops and raising livestock. This stimulation of ground insoak and stepped-up retention of water over the basin area also servess to raise the underground water tables on which many cities depend for their municipal supply.

These small retention dams can be constructed quickly, easily, and inexpensively and, in series, will impound far more water at far less expense than the large single reservoirs.

HOW TO ORGANIZE

The process for organizing a watershed district is relatively simple. A few people, who are sold on the idea, sell their neighbors in turn until enthusiasm can produce representative action for the area proposed. A mass meeting is a quick and satisfactory way of launching action.

At Osage City last week those present voted to form a nonprofit corporation to carry on the necessary activities of education, promotion, and fund raising. There will be a board of directors numbering 25 with representatives selected on basis of locality an dability to assist. The cost of the soil-conservation work can be paid on the present basis of the soil-conservation service and farmer sharing. Funds for survey are usually sought through congressional appropriation. The retention dams are paid for according to benefits derived. If they are solely for flood prevention downstream, Government pays the charge. If the farmer plans to utilize part of the reservoir area for stock use, he shares to that extent.

Acutally, the benefits to be derived for the district, rural, and urban, are great enough that the program invites action with or without Government assistance.

The watershed program is gaining momentum fast. It is the only program of the three proposed that is installed and maintained under local control. It can be put through for the Missouri Basin with control kept at the local and State level if enough men and women of vision and courage will join the movement.

We mentioned at the beginning that there is something about the watershed program that inspires to religious zeal. To name a few such converts, there are Louis Bromfield, Elmer Peterson, of Oklahoma, Barr Ketchlear and Ken Randall of Iowa, Ray McConnell, Jr., and Stan Matske and a number of others in Nebraska.

Like everything else in America, flood-prevention programs that are developed by "we the people" will be successful and raise our standard of living even more. Control of the watershed-treatment program can and must be kept at the grassroots level.

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A Flood-Control Plan

In the matter of flood control, it appears that Kansas is allowing the cart to get ahead of the horse. By this the Daily Capital means that flood-control planning and operation should follow the pattern of the floods. It should start with the fields where the rain falls and continue with small and large dams on the tributaries and levees along the main streams.

To start with the levees, as we have done in the past, and proceed upstream to the large reservoirs, as we are now planning, is to work backward. How are we to know to what height levees must be built, and what size reservoirs must be constructed, until we decide to what extent it is possible to control the water runoff on the fields and retard the output of the creeks?

If we are to have flood protection we must start in the hills. We must hold as much as possible of the rain where it falls. What runs off the fields must be retarded by farm ponds and check dams on the creeks. And we must have reservoirs and levees to protect the cities and valleys of the main streams.

The Daily Capital wants upstream soil consevation and flood control coordinated with the big reservoirs and levees. We want water conservation on the land so the dams will be built no larger than necessary, or in greater numbers than needed. We do not want our hard-earned tax money wasted.

For that reason, the Daily Capital today publishes on page one a comprehensive article on watershed flood and erosion control. It concerns the sensible action of the residents of the upper Marais des Cygnes watershed in forming a locally planned and locally operated corporation to apply water and soil-saving techniques developed in actual practice in other parts of the Midwest.

Residents of the Blue River watershed are interested in a similar organization, as are residents of the Delaware watershed. But what about the Wakarusa watershed? Or Soldier Creek, Vermillion Creek, Mill Creek, Mission Creek, and scores of others throughout the Kaw Basin?

The Daily Capital points out that the greatest damage from floods, aside from the loss of human life, is to the land through sheet and gully erosion. The cities and the industries can be built again, but the soil has been lost forever.

It is the same soil that has made Kansas rich and upon which our cities and industries are founded. The big reservoirs and the levees which the Federal agencies plan to build will not prevent our losing another half billion dollars' worth of soil, as we did in the single month of July 1951. Nor will they stop floods on the little rivers and the creeks, such as the Wakarusa and Mill Creek. More than likely they will not even protect our downstream cities, unless we also control local runoff and small streams.

On this matter we cannot look to Washington to take the initiative and send out Federal planners to do the job for us. Our soil may be carried away to the Gulf of Mexico before Federal aid arrives. We must follow the example of our Nebraska neighbors in the Salt-Wahoo watershed and do the job ourselves.

As part of the great Kaw Basin family, the Daily Capital wants to take part in the development of these watershed districts. We urge others to join with us, confident that working together we can save our soil—and our farms and villages at the forks of the creeks.

[From Abilene Reflector-Chronicle, October 6, 1951]

Says Floods Can Be Held

An expert on the subject believes that normal flood threats on Mud Creek can be greatly reduced and possibly eliminated through a combination of soil conservation on the upland farms and retention check dams to hold the runoff water temporarily.

This view was expressed by Melvin Rogers, soil conservation representative in this district, in a talk to the Rotary Club Friday noon. He said there has been a great increase in the interest in soil-conservation practices among the farmers of Dickinson County during the past year.

Explaining that only approximately 25 percent of the farms in the Mud Creek watershed are currently included in the soil-conservation program, Rogers said 100-percent cooperation in the conservation crop rotation, terracing, and pond program "would greatly reduce the threat of floods on Mud Creek."

"There are approximately 86 square miles of drainage in the Mud Creek watershed above Abilene," he contended. "Add to the upland farm treatment program

a number of medium-size retention dams, probably about 12, and I believe the threat of normal floods from the creek would be eliminated."

Rogers described the retention, or check dams, as a cross between large ponds and reservoir dams. They should be located at strategic points on Mud Creek itself and major tributary streams such as Tom Creek. Each dam would have a run off built in it to drain the water long enough to prevent flooding but yet are designed to hold back the water long enough to prevent flooding but yet not long enough to cause permanent inundation of large areas.

Rogers has been cooperating with the Abilene Flood Control Committee, which is investigating this program as a possible solution to local flood problems.

"We are convinced that flood control starts on the upland farms where the rains fall," said Rogers, who added that his primary interest is in soil conservation and not flood control—although the two work together.

Pointing out a startling fact which he agreed few people realize—that in ordinary years 75 percent of the annual so-called flood damage is on the small tributary streams such as Mud Creek—he said the main objective of the Federal soil conservation service is "saving the land" for future use.

Two high-school boys, Mark Mayden and Bob Snider, were introduced as Junior Rotarians for the next 6 weeks.

[From Clay Center Times, October 18, 1951]

MUST CONTROL FLOODING WHERE RAINFALL OCCURS—STATE REPRESENTATIVE AVERY TELLS LIONS CLUBS OF GREEN AND CLAY CENTER HE IS CONFIDENT THAT A FLOOD-CONTROL PROGRAM FOR ALL KANSAS WILL SOON EVOLVE

William (Bill) Avery, Clay County representative in the State legislature and long a student of conservation in respect to flood control, was the feature speaker at a rural acquaintance meeting in Green Wednesday of Clay Center and Green Lions Clubs.

Speaking on flood control, conservation and the varying aspects, Avery traced the history of Kansas efforts individually and collectively, to control floods since the first official interest in the late 1920's. It was no coincidence, he stated, that he was personally interested in the particular subject, for his father headed the first flood commission in Kansas and he toured the State with his father and the commission studying what little conservation, reclamation and irrigation that was being done at that time.

In 1928, Avery continued, the Federal Government took over flood control of all navigable rivers in Kansas (which was practically all of them) and the commission ceased to exist as an effective agency. The Army engineers were assigned to the job which primarily consisted of building levees and dredging the river with only mediocre results along the Missouri Valley. Then the engineers moved up river in the 1930's but those were generally dry years with no flooding, he said.

Then came the floods of 1935 and the Pick-Sloan plan was evolved for the Missouri Valley. The flood of 1935, Avery declared, was the worst flood to ever come down the Republican River or its tributaries, and a demand came from up and down the valley for preventive measures. The Army engineers decided on the Milford Dam as the most logical and effective place to control the floodwaters. And, he added, the Milford Dam would have been built except for one thing—the lack of money. A maneuver, led by Senator Norris of Nebraska, in which money could be obtained for a dam at Harlan County caused the engineers to switch their plans and it was decided that the entire basin could be controlled with the Harlan Dam and there would be no need for the Milford project. But once the money and approval for the Harlan Dam were assured—zing—the engineers reversed themselves and declared that the Milford Dam was necessary, too. Many people, including himself, felt double-crossed and became advocates of a watershed-type program.

"He gave much credit to Dwight Payton, Overbrook editor, for evolving a very constructive chain of thought for flood control for everybody and raising the hopes of those who were resigning themselves to the fate of a Missouri Valley Authority.

Unbelievable as it may seem, he asserted, only 25 percent of flood damage is done in the valley. Seventy-five percent damage is done to farms, in wheat and corn fields, on much higher ground.

Avery stated he felt confident that a flood-control program will soon evolve for all of Kansas. The only logical place to stop a flood is where the fall occurs, he observed.

He cited the reversal of policy of the Topeka Daily Capital from favoring the Pick-Sloan plan to the watershed program as typical of those vitally interested and who have studied thoroughly each of the various plans for flood control.

Avery dwelled briefly on the Shippel Ditch in Saline County pointing out that the farmers pooled their PMA payments to build draw-down reservoirs, the key to the whole flood program, to preserve the productivity of the soil. Draw-down reservoirs are not built to form a pasture pond or a lake, he declared, but used only when needed to catch and contain water; a drain pipe is open at all times to permit the water to flow through.

The public doesn't want another lake similar to the Kanapolis Lake, he added, that is always full and cannot contain water during periods of heavy rainfall. Dames cannot be constructed to serve double purposes effectively. You have to sacrifice either the recreation and power development facilities or else the flood control.

Another more comprehensive soil conservation plan, the Missouri River Basin agriculture program, not to be confused with MVA, was evolved in 1939. It provides for soil treatment along the entire Missouri River basin but has never gained much support.

Where do we go from here, Avery asked? The basic need is to find the greatest productive method for preserving the agriculture we now have.

[From Kiwanis Magazine, October 1951]

HODGE PODGE IN WATER MANAGEMENT

(By Arthur H. Carhart)

We take water for granted. It rains or snows. Streams flow. Some of the water goes into the ground where a tremendous proportion of it is drawn up and pumped out through the leaves of plants to reenter the atmosphere, or that which escapes the thirsty roots enters the underground flow that supplies our groundwater resources.

We thoughtlessly turn a tap; the water is delivered to us. It costs about 5 cents per ton on the average to bring you that water through that tap. Water is the most abundant mineral, it is the cheapest—and it is the most precious.

Of all the wealth of the Nation, no one resource is so universally essential to maintaining our lives as water. And we have reached the point in reference to this vital necessity where future progress rests positively and totally on husbanding the resource, putting it to its full use, managing it with the best intelligence and economy possible.

With this situation facing us, what we are doing with and about water is a mixture of headlong action, inadequate planning, conflicting programs and agencies, and billions on billions of dollars in prospect as the cost of our confused activities.

In two Federal bureaus alone there are plans afoot which contemplate the expenditure of $53,000,000,000.

These two agencies are the Corps of Army Engineers and the Bureau of Reclamation. If anywhere there should be coordination, economy, leadership, it should be found in these two greatest of our public organizations dealing with our most precious natural resource wealth. They are far short of meeting any of these attributes.

The Army engineers are charged with building works to control floods and keep navigation channels open. A great part of their work has been from the lower end of the rivers progressively toward headwaters. Building dikes and dredging will hold back floods; but, in so doing, water accumulates upstream and more work is required there, to the point that giant dams become necessary. The Army engineers control floods—or try to. Their work doesn't include primary flood prevention.

The Bureau of Reclamation is charged with the construction of dams to impound waters that can be released during growing seasons to irrigate lands where natural precipitation is insufficient. Reclamation's works have been farther toward the high reaches of streams. Water impounded in upper basins can be released through canals to flow by gravity to lands flanking valleys farther down the watershed.

The basic objectives of the two agencies are in conflict. Obviously a reservoir built for flood control must be partially empty to hold back flood inflow; if it were full when a flood hit, the excess water would pour on through into the stream below the dam. As obviously, the ideal situation in irrigation storage is to have as much water impounded as can be stored, to insure adequate supply for releasing in summer when crops need moisture.

By building much greater dams and reservoirs, then allotting part of the storage space to flood catching, the other part to storing irrigation water, one such structure might serve the dual purpose—flood control and irrigation. That could be done. But dams required would be much greater than the sum of construction required for a dam at that location serving only the one or other purpose. The basic conflict is in the objectives of the two agencies and the directives from Congress which limit their area of activities.

Army engineers working upstream met Reclamation working downstream. Two concepts of water mangement came in conflict. Congressional acts and definitions of responsibilities were at variance.

A race began to see which agency could stake out possible dam sites first, get these approved, get appropriations and more personnel. That race still is in overdrive. A report printed in the Congressional Record 2 years ago, based on a survey made of all water-development projects, placed the ultimate total cost at $53,000,000,000.

That means every family in the Nation would underwrite an average of $1,500 in costs of these projects. No reimbursement from those benefitted by Army engineer projects would be required. Reclamation law provides for projects to pay out in part, but many have not done so; many more probably cannot hope to reimburse the Treasury for all charges originally allocated to those benefited.

That both the Army engineers and Reclamation have done good jobs in a number of places cannot be brushed aside. But in the rushing, get there first, get a foot in the door by congressional authorization, then more and more appropriations to "protect the investment," the big dam stampede has set up some big money projects that—

Let's look at just a few examples of what these boys may do with your money when they get hold of it.

Cherry Creek, which runs through Denver, has its headwaters in rolling hills east of the front range of the Rockies. Some four decades ago the city built concrete walls along the channel through the city. When thunderstorms spill over the hills, Cherry Creek runs heavy water. During one of several such storms during the 1930's, an upstream dam gave way, adding the impounded water to the runoff from the rain. The creek brimmed over the concrete-sided channel in some places. The damage was not staggering, but the community decided to prevent any such recurrence.

A PWA project was set up to put a flood-control dam across the creek above the city. It was designed to hold back a flood peak considerably greater than any of record. It seemed adequate. The Army engineers got into the act and decided other engineers who had figured the plans for the PWA dam were short in their estimating.

So the Army engineers planned. then built a great dam, just above the first flood-control structure, that is 14,300 feet long, 174 feet high at the highest point, at a cost of $15,700,000. If it ever rains on the Cherry Creek watershed for 24 hours at the rate it did rain for about 15 minutes during one storm on one side gulch of that watershed, that dam will control that hypothetical flood—a flood 5½ times that of any known record.

Only the Army boys could figure that any such flood would come. Nobody else believes it ever will.

Your tax money helped pay for this great dam above a dam deemed adequate, since costs of projects constructed by the Army engineers are not assessed against property benefited. All taxpayers pay for all Army engineer ventures. Meanwhile the big dam stands majestically, with a dry basin above it, the PWA dam below it, as a lovely example of what the engineers can do when they find a stream, get an authorization, and Congress appropriates money.

Now let's look at Reclamation in action.

The Keyhole Dam on the Belle Fourche River in Wyoming was authorized by Congress in 1944. It was to cost $750,000. It was first set up to have a storage capacity of 276,000 acre-feet of water. That must have seemed to be a very dinky project to an outfit often blueprinting jobs that run a hundred million, a half billion, maybe a billion or so. Keyhole got revised.

In 1950 the estimated cost was $5,598,000; the capacity had been raised to 628,000 acre-feet. By that time Reclamation had incurred costs of $2,000,000. To show for that there were some 25 structures in a construction camp, a road to the dam site, and some test holes dug to see if and how a dam that would stand up could be constructed there.

The Belle Fourche River's flow records, taken from 1944 to 1949 gave Reclamation a hard jolt. The dam scheme had been predicated on a 6-year record of 1925 to 1931, when the average flow of this river, which was to fill the Keyhole reservoir, had been 34,873 acre-feet per year.

But something had happened. Soil Conservation Service and ranchmen projects on the watershed had installed over 3,000 small headwater dams to utilize the water where it fell. Other dams spread creek waters, that formerly ran down to the Belle Fourche, to moisten range pastures. The 1944–49 average flow of the river was only 18,750 acre-feet.

That is not enough to put the planned capacity of that reservoir in service.

If some gully washers did fill the reservoir, 15,000 acres of productive bottom land in Wyoming would be flooded to supply supplementary water to 2,600 acres in South Dakota.

On top of that, the South Dakota farmers, who would be expected to use this supplementary water and pay part of the costs of the dam, voted 169 to 155 against using any of that water.

In the midst of this jumbled mess, Reclamation signed contracts to proceed with the building of this maybe-without-water dam. They were authorized to do it; Congress had cleared the way. By gum, they're going to build that dam.

That's peanuts. Down in Arizona there is a project that in its first phase is estimated will cost $728,000,000. It is difficult to guess what the final cost will be, but some declare it will finally take $250,000,000 of Uncle Sam's money to do the job. All this spending is proposed to rescue some farmers in that area who have so overpumped their ground-water reserves that these have played out.

Or let's look at the Big Thompson project in Colorado. The original estimate was $44,000,000. Admittedly now it will cost $200,000,000. And the engineers have found that there is not enough water in the basins from which the project derives its water, by 80,000 acre-feet, to fully put what the blueprints show, in service.

Or glance at the Pick-Sloan plan for many dams on the great Missouri. Here the Army engineers and Reclamation slapped together all the blueprints they had to provide a "plan" for the whole basin, because there was a threat of Congress creating a Missouri Valley Authority. The "plan" is a goulash of two sets of blueprints, prepared with different objectives, on first estimate to cost $6,300,000,000, and that plan is authorized by Congress and going ahead.

Proponents of big dam irrigation projects advance a nice-sounding statement in support of these installations—that irrigation law provides for water users to pay back costs of construction out of benefits derived. Basic reclamation law does say that.

Some projects, almost wholly serving irrigation, are doing a good job of paying out. But every Congress in recent years has passed acts for the "relief" of farmers on many irrigation districts. Landowners simply could not pay costs allotted to them. Taxpayers had to shoulder what got written down or written off.

Recent and prospective "irrigation" projects are, in fact, dominantly public power schemes. That power potentials should be utilized is commendable. But the sale of power actually operates as a subsidy of the irrigation portion of these installations. Power customers pay over and above the true cost of that power to thus actually subsidize irrigation. There thus is actually a hidden tax on power users to underwrite irrigation farmers.

Furthermore, in drawing up project statements, Reclamation now is including large sums that are "nonreimbursable"; general welfare items supposed to be worth the money spent because they are of benefit to the community at large, as all of Army's flood control costs are reckoned as benefiting everybody.

A legitimate question is whether or not we are spending our dollars in the right places. A half billion dollars may supply enough additional water to an Arizona area to keep 150,000 acres in continued tillage.

Half of that surely would go a long way toward preventing the loss of 500,000 acres of farm land which we are losing every year, which might be saved by good soil-conservation practices.

There is a big question of whether it makes sense to spend millions downstream, dredging channels and building levees to control floods after they have gathered volume and strength, and pay slight attention to maintaining conditions on watersheds where floods begin and by proper methods prevent floods. One wonders how much of the floods of 1951 in the upper Mississippi Valley might be charged to the drainage, ditching, and channel straightening upstream, which would tend to shoot the waters down into the main river all in one mass.

Along the levee, downstream, costly engineering works failed when the July floods poured down through Kansas. Sandbags franctically filled and stacked atop the engineers' dikes did ward off flooding in some areas. But the basic thesis of controlling the floods downstream by construction methods certainly had a test there this past summer—and the result was catastrophe.

Using these Kansas-Missouri floods as a springboard, those who advocate big dams are shouting for more and bigger engineering works. Before any millions or billions are tossed into such flood-control programs, we should take a long look at the fundamental approach of managing the watershed so it would not dump the whole mass of downpour into river channels in great volumes—and then try to control it. Floods might not be wholly eliminated by contour cultivation, by strip farming, by many little reservoirs holding water back in the area in which it falls, by keeping slopes in grass and trees, but it is certain that such practices on the higher watersheds, at far less cost, would flatten out flood crests that have licked the downstream approach, not only in Kansas and Missouri, but many another flood-blighted area.

Above all, a lot of what we are doing about water of our streams is this downstream, wrong-end-to sort of engineering construction, when the management of water should start at the top-most ridge of a stream's basin.

A gesture toward inclusive, coordinated planning in water wealth management has been made by the formation of what are called interagency committees. They include representatives of the two engineering bureaus, plus others from the Forest Service, Soil Conservation Service, Fish and Wildlife Service, and similar natural resource agencies.

Actually, as they met, these committees had placed before them the completely planned engineering-constructional projects, often already approved by Congress and thus fixed in what will be done. In that position, instead of the coordinate planning from scratch that is essential to final sound water wealth management, the other bureaus have been faced with fitting their plans and policies to the dominating engineering schemes—when genuine coordinated planning must start with all groups working together from the beginning. Existence of these committees does not change the situation.

There isn't any adequate, coordinated, inclusive planning at the Federal level in our water-development agencies.

The confusion and cross-purpose action and spending at the Federal level is repeated in a degree in every State. State engineers, water boards, drainage commissions, conservation departments—all operating within some limited, law-defined field—get in conflict and competition just as the Federal boys do.

Even municipalities with a water board, a sewage commission, a health department having some interest in both instances, city engineers, and other boards, may be giving top-rate service in their limited, circumscribed jobs. But no inclusive water-use plan exists.

The waste of the multiplicity in all agencies we have set up to handle our water resources, the segmentary fields in which they work, the conflicts and competition that result, are enough to scare the "britches" off any person who will think a little soberly and inquiringly into how helter-skelter is the way we are assigning the management of water wealth to public bodies. Nothing but waste and conflict can come out of such a system—or rather the lack of any all-embracing system.

Far beyond the wastefulness of funds is our losses in the piecemeal, cross-purpose messing-up of that cheap but precious resource we have in water. In the past, any one board or agency might have been in a position to draw on our water "bank account" for supplies needed to carry out objectives assigned to a specific agency. More water was available than demands required. That time is past.

Before becoming too critical, business and industry should give a searching look at their position in water management. Water is public wealth. No individual or interest can secure fee title to water. What may be acquired is a right to make use of water at some point in transit from high watershed to rivers' mouths.

The right to utilize water does not carry with it the privilege of destroying or excessively diminishing further usability. The manufacturing plant now drawing water from a relatively unpolluted source, but dumping wastes back into a stream to the detriment of other uses below, may tomorrow find operations threatened by a new plant that is a waste-dumper in its essential supply.

Business and industry, as a matter of purely selfish but constructive interest, can do a lot of policing within its own ranks. Anyone who wishes to criticize is in a far more defensible position if they have corrected their own bad behavior before they start throwing rocks at the other fellow.

There is a lot of work to be done to secure sound water management—and we've all got to work at it.

First from the standpoint of wiping out confusion, competition, and cost, we must move swiftly to a water-management policy and plan which will start with management up where the rain drop falls. Planning must start with the watershed; not downstream. Second, and far beyond the factor of wasted dollars, we must have such planning and management inclusive and integrated, to guard against the certainty that our present criss-cross activities are leading to—to the certainty of so badly jigsawing our water wealth that we never can get an over-all plan for the water resource and its full use in the future.

But there is no place in tomorrow for a bumbling, bungling, conflicting handling of water by public agencies. Water is just too totally indispensable in American living to tolerate the present jumble in water-resource management that exists across the Nation.

Mr. HOPE. Thank you very much. We will next hear from Milton Vogel, executive secretary of Kansas Council of Churches.

STATEMENT OF REV. MILTON VOGEL, REPRESENTING THE KANSAS COUNCIL OF CHURCHES

Reverend VOGEL. Members of the subcommittee, it has been commonly said that the average preacher goes down, stays down longer, and comes up dryer than anybody else, and perhaps in making some speeches it is true, but what I will have to say to you is very brief. It is not going to be a statement of plan but of principle. At the last meeting of the Council of Churches a question was brought up about soil conservation and flood control and I would like to read from that statement and then make a few comments:

STATEMENT ON FLOOD CONTROL BY THE EXECUTIVE COMMITTEE, KANSAS COUNCIL OF CHURCHES AND CHRISTIAN EDUCATION

During the summer of 1951 the people of Kansas experienced a devastating flood which destroyed or damaged thousands of homes, farmsteads, schools, churches, places of business, and inundated thousands of acres of rich soil in these valleys. Following such a catastrophe it must be recognized that there is always the divine spark within the soul of man to rebuild. However, the flood was so destructive that there was also planted very deep in the hearts of the people who lived in these valleys the fear of future floods especially with the destruction of protective dikes and the changing of river courses, etc. Certainly the need for some type of coordinated flood control is imperative. The executive committee of the Kansas Council of Churches is not in a position to state what type of flood control should be put in practice but would like to urge that political bickering over the situation in local, State, and Federal Government cease and that every effort be made to work out a reasonable, honest, and coordinated plan for soil conservation and flood control on the Kansas rivers (keeping in mind the moral implications of any plan) which will provide for the greatest help to the general welfare of the people of Kansas.

We further urge that the church people of Kansas become aware of the need for soil conservation and flood control and to face the situation objectively and to do everything possible through education and information on the facts to bring about a reasonable and coordinated plan for the general welfare of the people of Kansas. It was also recommended that an outline of study be drawn up for distribution to the churches for study.

There is one item in this statement which I would like to emphasize and then add a few simple remarks.

The item I would like to emphasize is that we keep in mind the moral implications of any land. (Unfortunately, public enterprises oftentimes have exploited the people in the area in which they are carried on instead of being carried on for the needs and general welfare of the people there.) In other words, we are so often poor stewards of what rightfully belong to others, whether that be human right or property. Facts are so often distorted in order to keep the people quiet. In order to keep democracy strong we need to keep in mind the importance of moral integrity for the benefit of the people instead of the benefit of the few.

I would like to remind this audience that we are living in a world where the natural laws of God remain constant. One of these laws is that water seeks its own level. These rich valleys have been created by that law. Man cannot hope to change in a few years what has taken nature hundreds of years to form. If we did not heed that law before, we should have learned it in this recent flood. If we build our houses and establish our factories where water runs downhill, then we should be prepared to suffer those consequences when the water comes. Let us be sure what we do is going to be for the best.

Furthermore, we should keep in mind what will provide the greatest good for the general welfare of the people in the future, and not just what will benefit us in our lifetime. A plan that will only provide benefits for people for 50 or 100 years at a tremendous cost in taxes and property loss would not seem to be a sensible plan. After all, a hundred years is really a short time in the course of human history.

Therefore, on behalf of the Kansas Council of Churches, I plead that whatever plan is developed, that it be reasonable, honest, absent of political bickering, that moral integrity be guarded, that the laws of God in nature are constant and cannot be disregarded, and that we be concerned with what will benefit people the greatest in the long course of human history.

Personally, not speaking for the council I represent, I am in favor of upstream flood prevention instead of flood control.

We of the church realize that stewardship of the soil is just as important as stewardship of any other possession. Personally, not speaking for the council I represent, I am in favor of upstream flood prevention and if necessary, other means, and I want to assure this committee that the church people of Kansas are always praying for our Representatives in Government that right will prevail, and we appreciate the integrity and sound thinking which you men of this committee have represented and expressed for us here today.

Mr. HOPE. Thank you very much. The next witness is Claude Brey, Ozawkie, chairman of the Delaware River Basin Citizens Association.

STATEMENT OF CLAUDE BREY, REPRESENTING DELAWARE RIVER BASIN CITIZENS ASSOCIATION

Mr. BREY. Mr. Chairman, honorable board, and committee, we are indeed happy to have you come to Kansas and hear our story perhaps, and also maybe see some of the damage that has occurred.

My name is Claude Brey.

I happen to be a farmer and I live on that little stream that you heard about this morning, the Delaware. Perhaps from the story you think we are all starved to death down there. I am also chairman of the Delaware River Drainage Board.

I appear before you as an individual and also as chairman of the above-mentioned groups.

We are now reorganizing our organization, the Delaware River Basin Citizens Association, into a more widely represented group which is known as the Delaware River Watershed Association. This association is dedicated to the task of promoting an intensified proper

land use and farm management program combined with soil and water conservation program on an entire watershed basis.

The directors of this association are selected from and by the land operators of the various subwatersheds, this procedure is almost completed and the directors chosen have contacted a large percent of the landholders within their respective areas and they have expressed confidence that at least 75 percent of the landholders or land acreage will readily adopt and support such a program and in a reasonable time there will be greater participation, provided a reasonable and just support is provided through State and Federal agencies.

The now existing soil conservation agencies are doing a marvelous job of developing proper land use and soil conservation practices on the limited amount of funds available. There is no doubt that these existing agencies will cooperate on a watershed basis on a long-range program as has thus far been demonstrated.

The Delaware River, Perry Reservoir project, as proposed by the Corps of Army Engineers in their original survey represented an outlay of about $12,000,000; that was in 1946. The watershed area of the Delaware River is estimated to be 1,144 square miles, with 1,059 square miles of this area upstream of the site of the proposed structure.

This representing an outlay of more than $10,000 for each section of land from which the drainage is to be controlled. Such a program renders absolutely no benfit to any of that area, and destroys a large section of the same, for what?

To provide a meager degree of flood protection to a small area downstream and also to provide an indefinite and limited amount of benefit in the form of seasonal stream flow.

Gentlemen, it is our contention that with a far less outlay of funds by the Federal Government expended on a proper land-use soil-and-water conservation program administered by and with now-existing agencies greater results can be secured for the common good than through construction of large and destructive projects.

Such a program should include reseeding of lands not adapted to surface cultivation, construction of terraces, farm ponds, and sufficient retention reservoirs on less productive land and will avoid dislocation of residents, individual property, as well as property of corporations, utilities, and the general public, will provide and restore a more stable water table thereby increasing the normal seasonal flow of all streams, provide increased recreational facilities, a more abundant wildlife and lastly retain for posterity a more productive agriculture, for the future of America. Tank you.

(The following information was submitted by Claude Brey:)

STATEMENT SUBMITTED BY CLAUDE BREY, THE DELAWARE RIVER WATERSHED ASSOCIATION

I. THE WATERSHED

The Delaware River watershed comprises 1,144 square miles in northeast Kansas, including parts of Jefferson, Jackson, Atchison, Brown, and Nemaha Counties. It is that area drained by the Delaware River and its tributaries.

II. THE ORGANIZATION

It is proposed to organize a Delaware River Watershed Association as a nonprofit, nonpartisan corporation for the purpose of bringing to all of the land and all of the people in the area, the protection and other benefits of a complete pro-

gram of soil and water conservation, erosion control flood abatement, and recreational and wildlife development.

As a means of securing a well-balanced local representation, it is proposed that the watershed be subdivided into 12 districts, each one in turn comprising a subwatershed of the area as follows:

1. Wild Horse Creek.
2. Rock Creek.
3. Big Slough Creek.
4. Little Slough and Brush Creeks.
5. Coal and Walnut Creeks.
6. Cedar Creek.
7. Elk Creek.
8. Straight Creek.
9. Grasshopper Creek.
10. Little Delaware.
11. Muddy Creek.
12. Craig, Plum, and Delaware Creeks.

III. THE PLAN

1. The heart of any conservation plan begins with proper care and use of the land. These practices originate on each individual farm, are within the jurisdiction of the landholder, and pay handsome dividends to the landowner for those measures adopted, such as:

(*a*) Use of all land for purposes to which it is best suited.
(*b*) Reseeding of certain areas to grass.
(*c*) Contour or strip farming.
(*d*) Terracing and seeded waterways.
(*e*) Gully control.

These measures retard water runoff so that more moisture infiltrates into the soil, recharging ground water,, reactivating springs, and providing moisture for increased crop production during dry seasons. Experience shows that these measures will retain as much as 3½ inches of rainfall which otherwise would contribute to damaging floods.

2. Flood abatement begins with the above-described measures. In addition, however, it is necessary to provide a series of detention reservoirs to temporarily hold the excess water runoff resulting from extra heavy and prolonged rains. Such detention reservoirs are so designed that the water is discharged at a rate which the stream channel below can carry without flooding. This is accomplished without retaining the water so long as to damage pasture grasses growing within the reservoir area. Such flood storage can also be combined with permanent pools which will supply water for home, livestock, irrigation, or recreation as may be desired by the local landowner. Best of all, experience shows that a series of such detention reservoirs can be constructed at a cost per acre reservoired, or per acre-foot of flood storage, which is from 50 to 60 percent of the cost of larger flood-control structures.

Finally, the detention reservoirs, by protecting the small creek valleys from flooding, actually increase the agricultural production of the area, whereas a large reservoir inundates a large area of our best soil.

3. Recreational and wildlife development, made possible by the foregoing practices and structures, will provide fishing, boating, hunting, picnicking, and other outdoor facilities. Year-around running stream and springs, in addition to ponds and lakes, will provide healthful, wholesome recreation which does not exist to a measured degree at present.

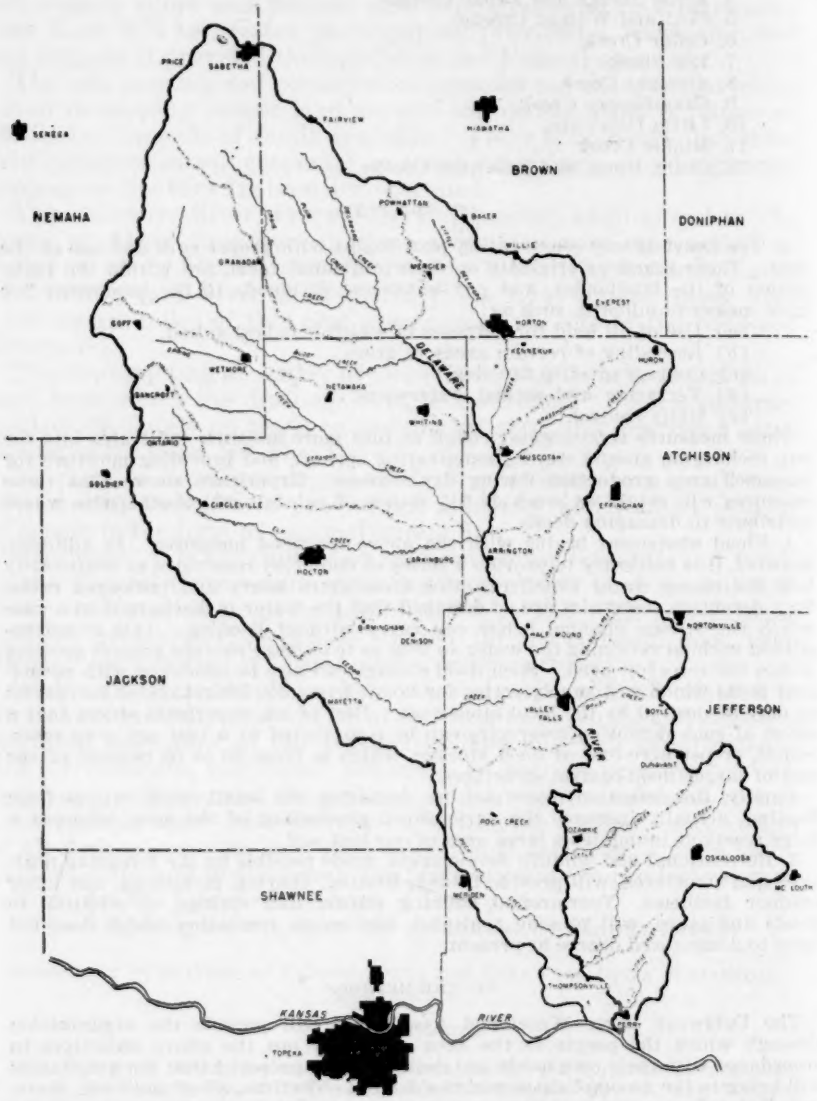
IV. THE METHOD

The Delaware River Watershed Association will provide the organization through which the people in the area can carry out the above objectives in accordance with their own needs and desires. It is proposed that the association will bring to the accomplishment of the desired objectives, all of the local, State, and Federal agencies that have something to contribute to the success of the plan, such as county soil-conservation districts, county farm-extension agents, local business and industrial firms, Kansas State Board of Agriculture—Division of Water Resources, Kansas State College—Extension Service, Kansas Highway Commission, Kansas State Board of Health, Kansas Forestry, Fish, and Game Commission, United States Department of Agriculture: SCS; PMA; Forestry Service, etc.; United States Army engineers.

V. ACTION

This is our valley. These are our problems. By working together we can develop a river plan that works, a plan under which land and people prosper. Let's do it.

DELAWARE RIVER WATERSHED



Mr. HOPE. Thank you very much. We will next hear from Mr. Noel T. Tweet.

STATEMENT OF NOEL T. TWEET, REPRESENTING KANSAS CITY CHAMBER OF COMMERCE

Mr. TWEET. I am Noel Tweet of the Kansas City, Kans., Chamber of Commerce. I will make mine very brief. I am chairman of the housing and industrial department which takes care of the flood end. Our telephones ring constantly with inquiries about who is going to do this and that, what do we have to look forward to, et cetera. There are hundreds of families without homes. It is almost 4 months since the flood. I think the people are entitled to some kind of plan and insurance. They can't get flood insurance but surely there is somebody with some plan that can tell these people something, and in line with that I believe the thing that can be done the quickest is the thing we should try to accomplish. Some of these things have been planned and talked about, particularly in Kansas City, for the last 20 to 25 years. Surely, part of those plans are good. Why not go ahead with those projects? Why not give the people some confidence, some assurance that some kind of flood control is going to be provided? We have had a lot of meetings. People are tired of meeting. They say, "Tell us something as to a future plan we can depend upon." That is the opinion I bring from our people and I know it is universally their opinion.

Mr. HOPE. Thank you very much. Next, Haysler A. Poague, of Clinton, Mo.

STATEMENT OF HAYSLER A. POAGUE, REPRESENTING OSAGE BASIN

Mr. POAGUE. Mr. Chairman, gentlemen. I come here representing the Osage Basin. It represents the area in Green County at Springfield and running approximately 200 miles north to Jackson County. In our basin we have the South Grand, Osage, and a couple of others. If members of the committee will indulge me and turn to page 4 of the maps you have before you, you will see the peculiar terrain down there which we have to deal with. Page 4 is entitled "Physical Land Characteristics." If you will look at the lower right-hand corner you will see an area in green. That represents hilly country. Immediately north of there—and you might say the Osage is bone dry there—is an area that represents moderately to sloping land. In other words, as you cross the Osage River coming north you run into a fairly level terrain. However, that entire area in there south of the Missouri, practically, is within the basin which I come here today representing.

I assume you gentlemen are interested primarily in what the people in each area are thinking. If our thoughts are not worth while, you can discard them, but I do feel and I promise you that the few remarks I make will be the best I can get of the majority consensus of opinion in that area.

We have down there various projects from time to time suggested. Some 8 or 9 years ago some dams were suggested on the lower Osage. At that time Governor Donnelly of the State of Missouri, in order that a survey might be made to determine the feasibility of the program, called upon the various governmental agencies. Some of the men who were most instrumental in making the survey at that time

are sitting in this room today. Dr. Ethridge was the coordinator, with the soil conservation, University of Missouri. Mr. Short, from the Missouri division, resource and development, is here today. As a result of that survey by Governor Donnelly, a very comprehensive flood-control program was worked out in which the Government engineers participated, the United States Soil Conservation participated, and in fact, all agencies that might in any way be affected. As a result of that survey the people of that area became reconciled that the recommendations that were made by the joint survey of all agencies would be cemented ultimately, if any program was cemented. That survey was not something that was gone into haphazardly but carefully gone into at terrible expense. It accomplished an over-all program of soil conservation.

The mountainous part of our area is the upper part, which materially affects the runoff from the conservation standpoint in your mountainous areas, where you can't contour and treat your upland with the soil practices that are recommended and we believe are fine. We did think and still think that a certain amount of retention dams on those tributaries, streams, are advisable. North of the Osage River we have some flat level land and that area is over 7,000 square miles. We do strongly endorse the results of this survey, which is on file in the various Government offices which set up a very definite concrete soil-conservation program to retard the runoff and to avoid the necessity of overly downstream structures.

You realize, gentlemen, we are at the bottom of the whole business. Half of the water that falls in the State of Kansas comes down. What the people of Kansas may do in regard to conservation, water runoffs, structures, we certainly will not attempt to dictate. But as to our particular area, we have felt we had a very comprehensive and concrete program that could be spread out before all who desired to study the thing. The matter more or less went on the shelf and until the flood this year, seems to have been forgotten.

This year we discovered to our surprise and amazement that there was a very considerable movement under way to authorize the construction of some major dams immediately in that area, entirely omitting any reference whatever to the vital and substantial soil-conservation program. In relation to that, I desire to file as an exhibit or exhibits, copies of two letters written by the Governor of the State of Missouri, on May 31, 1949, calling attention of the chief of the Army engineers to this program and the desire of the State of Missouri in that respect, and secondly, a follow-up letter to Senator Hennings, August 13, 1951, again reemphasizing the matter. I will not go into those letters and read them, except to say those letters both without equivocation clearly indicate that the Governor of Missouri does want the soil-conservation program incorporated, as they are inseparably connected with any other construction.

(The letters referred to above are as follows:)

MAY 31, 1949.

CHIEF OF ENGINEERS, UNITED STATES ARMY,
Washington, D. C.

DEAR SIR: Reference is made to a report entitled "Review Report, Osage River, Mo. and Kans.," dated January 14, 1948, prepared by your Kansas City district. This report recommends a plan providing for flood control, production of hydroelectric power, and other water resources development as proposed by the Corps of Engineers. The report does not cover such phases of development as soil

conservation, land improvement, and forestry improvement which lie outside the jurisdiction of the Corps of Engineers. It is my understanding that these phases will be handled by the Department of Agriculture.

The plan recommended in the report was arrived at through a cooperative study by some 12 or 15 State and Federal agencies which covered practically every phase of land and water resource development to some degree. This method of planning for stream basin development is rather new, at least in this State, and has met with a greater measure of success in the Osage River Basin than elsewhere. Although the method cannot be said to be perfect, it represents a vast improvement over methods previously used in this State.

The authorized plan for flood control, consisting of the Osceola, South Grand, and Pomme de Terre Reservoirs, was approved by Congress in 1938 although no appropriations were ever made for construction. This plan was designed primarily to reduce floods on the Mississippi River. The State was forced to oppose this plan because it involved too large a sacrifice to that portion of the State in which the Osage Basin is located. Only minor consideration was given to the development of the land and water resources of the Osage River Basin. The plan presently proposed would produce greater flood reductions on the Missouri and Mississippi Rivers and at the same time bestow greater benefit and involve less sacrifice in the Osage River Basin. The need for tributary storage to reduce floods on the Mississippi River and the economic value of such reduction has never been adequately explained to the State. Therefore, the State is forced to conclude that there is no carefully thought out national plan of flood control and hence cannot vouch for the economic feasibility of the Osage plan. However, if the national program requires a large volume of storage in the Osage River Basin, the State believes that such storage should be provided in conformance with the plan presently recommended rather than by the authorized plan.

It should be emphasized that the plan covered in the report represents only a part of the needs for land and water resources development in the Osage River Basin as revealed by the cooperative study. The basin will never realize the major portion of the benefits to which it is entitled unless these other needs are taken care of. The State urges that these needs not be neglected through major emphasis on only a part of the over-all program for the basin.

I approve the plan outlined in the report as being the best plan for the Osage River Basin under existing national policies with respect to stream basin planning. I wish to express the appreciation of the State for the cooperation and assistance of your organization in the Osage Basin cooperative study.

Yours very truly,

FORREST SMITH, *Governor.*

EXECUTIVE OFFICE,
STATE OF MISSOURI,
Jefferson City, August 13, 1951.

Hon. THOMAS C. HENNINGS, Jr.,
Senate Office Building, Washington, D. C.

DEAR SENATOR HENNINGS: It has been brought to my attention that currently pending before the Senate is a request for authorization of the reservoir system in the Osage River Basin as proposed by the Corps of Engineers in their report dated January 1948. As you know, the State, in cooperation with the interested Federal agencies, spent considerable time and money studying the Osage River Basin with a view to developing a comprehensive plan covering every phase of land and water resource. Such a plan was developed and approved by all participating agencies, both Federal and State. I also concurred in the plan.

The plan developed for the Osage Basin provides for reservoirs to control floods, develop hydroelectric power, recreation, and other benefits; and in addition, a land improvement program was approved consisting of proper soil-conservation practices, forestry improvement, and waterflow-retardation measures, the former to be under the jurisdiction of the Corps of Engineers and the latter under the Department of Agriculture.

The pending authorization for reservoirs in the Osage River Basin that has been requested of the Congress does not ask for the plan as finally agreed upon by all interested Federal and State agencies. It is believed that if the different parts of this plan are not initiated simultaneously the maximum benefits to the people of the State and the Nation will not be secured and Congress will not have fulfilled its obligation as expressed in the various flood-control acts. Fur-

thermore, if the reservoir program is authorized and not accompanied by companion authorization for the agricultural program, the time and money spent by the State and the Federal Government in the study of the Osage Basin will have been wasted. I am sure the citizens of this State, particularly those in the Osage Basin, feel that the entire program should be considered, not just one segment.

It is my hope and desire that you will give this matter serious attention and consideration and that you will expend every effort possible in securing adequate authorization to provide for the full development of the basin. For your information, I am enclosing a copy of my letter to the Chief of Engineers concurring in the proposed plan of improvement for the Osage River Basin.

Yours very truly,

FORREST SMITH, *Governor.*

Mr. POAGUE. We feel that it is only practical and sensible that we start upstream first. I think all of us have been thinking for the last few months in circumstances consistent with this year. Maybe that is a fallacy. There may be people in this room, and I may be seriously wrong in differing with them, but there may be people who think there are sufficient terraces and waterways and dams built in the Missouri River Basin to control the water that fell this year. In Missouri, in the area down there alone, the weather report that I got some months ago showed that in this year alone more than forty-some-odd inches of rain had fallen, and from the period beginning June 22 and ending in August, more than twenty-some-odd inches had fallen. Now, this one basin alone, and I am not referring to all of them, but the one alone with the watershed of 27,000 square miles, filling with 2 feet of water in less than 30 days, attempt, if you will, to estimate the kind of structure it would take to impound that tremendous amount of water. I don't say that in criticism. I refer you to what Senator Wherry said in August regarding the tentative situation, or what the chairman of the Appropriations Committee, of Missouri, said not 2 weeks ago in regard to it.

I think what we should consider, and what our people are considering is, what is the normal situation. Now, the normal situation in relation to our area through here varies. The further west we get, the less rainfall we get. The degree to which we can control or retard that rainfall by upland soil conservation practices may likewise vary according to the degree of rain which would reach the saturation point. So I feel there may be some fallacy in using an over-all figure of 10 or 15 percent or any other percent. I feel and our people feel that whatever program is adopted must start at the mouth of the stream. Adversely, by retarding water you must start at the utmost tributaries first, and as you come down you will by experience develop how large and to what expense it is necessary to build structures below or above you. As to soil conservation, we don't see why it can't be started simultaneously. Certainly, no money is wasted that is spent on soil conservation. It has been one of the things that has been so well proven to our economy that it might be universally approved and adopted.

A few months ago there was an organization formed representing a six-State area. That area was divided into districts of which our district was one of them. I happened to be elected by our area as one of the two members on the executive board. When certain resolutions were passed by that association, the two following resolutions were

passed that I think are pertinent to the meeting today, because it likewise affects all your areas in Kansas, Nebraska, and elsewhere:

Resolved, That we believe that the management of the leased lands in the reservoir and flood plan area owned by the Government should be in accordance with the recommendations made by the Soil Conservation Service and should be carried out under its supervision.

Now, gentlemen, there is something that has not been touched upon here today. In the areas where it has been necessary to purchase land for dams, there is a lot of ground lying around the impounded area, not to be inundated, but necessary to be purchased by the Government. There again the State of Missouri went into a very considerable investigation of the management of that area in a basin that has already been created in Missouri, and as a result of their survey I have here a very complete report made by the Missouri Division of Resources Development, and I would like to file it as an exhibit.

(The report referred to above has been filed with the committee.)

Mr. POAGUE. The unfortunate thing about these purchased areas—and that directly ties in with our soil conservation—is that apparently the Corps of Engineers has not set up any specialized department to take care of this land that they purchased out of the immediately flooded area, but necessary to be purchased. They have handled it heretofore on a lease basis. The landowner who sells his land has by necessity, or by choice, rather, done so and taken his money and moved elsewhere. Therefore it becomes an area of tenant-farmed land. So that resolution was passed, and we believe it is sound, and we believe this committee can very well take consideration of it, so that the land may be, wherever these areas are purchased—whether in Nebraska, Kansas, or Missouri—that these areas may be as speedily as possible returned to private individual ownership. Now, certainly, some soil-conservation practices must be tied in with that to save some of the area, and to the economy of the Nation as a whole, approximately hundreds of thousands of acres.

I want to also file in connection with my remarks two articles in the paper here, Thursday, October 25, one by R. Singleton, of the Missouri Agricultural Department, and one by Fred Heinkel, president of the Missouri Farmer Association. Both of those articles very thoroughly endorse the idea of a specialized upland soil-conservation program within the State of Missouri to prevent excessive runoffs and erosion.

(The articles referred to are as follows:)

[From the Clinton Eye, Clinton, Mo., October 25, 1951]

DAMS WON'T SOLVE WHOLE PROBLEM OF FLOOD CONTROL, FARMERS TOLD—ROLLO E. SINGLETON, MISSOURI AGRICULTURE DEPARTMENT, AND F. V. HEINKEL, MISSOURI FARMERS ASSOCIATION PRESIDENT, SAY "START UPLAND DEVELOPMENT FIRST"

Coincidentally or not, two different men have written articles on flood control in two farm magazines with practically the same conclusions, although each man has a different approach to the subject. Because of the logical thinking of both men and their reputable standing, the Eye is printing both articles.

Rollo E. Singleton, director of the livestock division of the Missouri Department of Agriculture, has written a thought-provoking article which appears in the October issue of the Missouri Livestock Journal. F. V. Heinkel, president of the Missouri Farmers Association, writes on flood control in the current issue of the Missouri Farmer. Both men say that dams and levees are not the complete answer to flood control, and both agree that the runoff water must be con-

trolled in the uplands by terracing, contour farming, farm ponds, etc. But let's read what they say. Here is Mr. Singleton:

"So much is being and has been written about flood control this summer that I cannot refrain from writing a few words treating the same subject. Unlike so many of the authors of articles I see in print, I do not wish to pose as an authority on the subject. Manifestly, a good deal of nonsense has appeared in print relative to flood control. If this article will induce a few people to think, I shall be pleased. Unless a sufficient percentage of our citizenry and voters begin to think on this subject, highly inappropriate, expensive, and ineffective action will occur in the near future.

"A great hue and cry has arisen in recent years for the construction of dams. Many editorials are being written, based on the false premise that the construction of dams will adequately control flood damage in the Missouri River Basin. During the 1947 flood, I spent a few nights in the Governor Hotel in Jefferson City. One morning, while the flood was at its height, a good friend of mine, and a man deeply interested in the agriculture of the State, called me to the window of his room, which offered a splendid view of the flooding Missouri River. After we had discussed the flood for a time, he said, 'It is very evident where the flood-control levees should be. If a levee were constructed on top of the bluff north of the river and another on the high ground south of the river, all the floodwater would pass between them.'

"As I say, I am no authority, but if the entire flood plain of the Missouri River for hundreds of miles up and down the river is covered with water from 1 to 30 feet deep at one time, how can a portion of that flood plain contain the same water? To me, the only answer would be, by having the water deepened. No one has had the temerity as yet to suggest that as much as 20 percent of the entire flood plain be dammed and available for water storage. To hold the floodwater on 20 percent of the flood plain would necessarily mean that the water would have to be five times as deep. No thinking person would consider construction of dams of sufficient height to hold water over any considerable area to an average depth of 100 feet. Moreover, this would only be possible if 20 percent of the entire flood plain were covered. Actually, no one has as yet proposed that as much as 10 percent be covered. A further factor is the fact that these lakes are not to be maintained completely empty of water. If they are to serve as sources of power, they will be kept partly filled at all times.

"A power dam was constructed at Bagnell, Mo., in the early 1930's. One of the arguments used in selling the idea for this construction to the public was flood control. In their enthusiasm for the construction of this dam, the power company, engineers, and others interested in the construction of the dam made flat statements that no flood would occur on the bottom land situated below the dam after its construction. Naturally, the farmers located on these bottom farms were highly pleased and favored the construction of the dam. Actually, the most destructive floods in history have occurred regularly in this area ever since the construction of the dam. The power company maintains the level of the lake quite uniformly. (Variations of not more than 15 feet occur.) In order to assure themselves of sufficient water for power development and, for that matter, in the interest of maintaining fish and moss for the production of fish in the lake, they delay the opening of the gates during any rainy period until the lake is practically to the maximum water level. If the rains have ceased by this time, no flood occurs below the dam. If they are continuing, water must be turned through the dam virtually as fast as it is brought down by the river. In other words, the rate of flow is as great at such times as if no dam existed. Moreover, because of the existence of the dam, a considerable overfall occurs and an initial impetus is given to the speed of the water. Most of the year clear water is turned through the dam, which, of course, immediately begins to pick up a new load of silt, at the expense of the farms below the dam. I presume that Bagnell Dam is an efficient source of power. It certainly has caused the development of a large recreational area. As a means of flood control, I doubt that the farmers concerned would approve of it had it been constructed without cost.

"Pearl Harbor reconciled many Americans to the evils of war. Such floods as the one of 1947 and that of 1951 are apt to result in drastic and possibly ill-considered action. Anyone who crossed the Missouri River bottom during the recent flood or since cannot but be impressed with the disastrous effects. Everyone aware of present conditions in the river bottom immediately becomes sympathetic to remedial action. To assist in the reduction of future floods and their destructive effects, it is not sufficient simply to spend an immense amount

of time, effort, and money. Action must only be taken after a plan has been perfected that promises to relieve the situation. To my mind, the difference between 4 feet of floodwater in your house or business structure and 5 or 6 feet of water in the same house or business makes little difference. Two feet of water in a wheatfield or cornfield results in total destruction of the crop. Three feet could do no further harm. Levees do not reduce the flow of water down the river valley. Their effect, rather, is to increase the flow of water in certain restricted areas. Dams of sufficient height and number would reduce the amount of floodwater but would themselves destroy the usefulness of thousands of acres of the best land in the area and certainly cannot be constructed in such quantity as to eliminate flooding.

"Fortunately, we have an alternative to the construction of dams and levees. When the Kaw River flooded industrial sections of Kansas City, Mo., and Kansas City, Kans., its destructiveness was on such a scale as to be dramatic. Its occurrence was much publicized. I do not wish to discount the loss that occurred in that area during the recent flood. Unquestionably, however, a greater loss occurred from the same rainfall on the farms and ranches where the water fell. The construction of any amount of dams and levees does not minimize or affect in any way this loss. The same expenditure of time and money that is so widely advocated for dams and levees in the Missouri River Basin would construct enough terraces, contour-furrow enough farms, and seed sufficient acres to grass as to materially reduce the amount of water that would travel down the Missouri River Valley. Holding this water on the hills and fields where it falls would increase the production on those farms, so that the inhabitants of the entire basin would benefit. Soil erosion losses are in no way reduced by the construction of dams and/or levees.

"At least these are my opinions, and I believe facts will justify similar conclusions in the minds of most thinking people. It is my hope that when action is taken it may be such as to effectively reduce the destructiveness of floods. If at the same time soil erosion on the many times greater area can be reduced, so much the better. Inasmuch as everyone will share in the costs of whatever projects are undertaken, this problem concerns the entire population. Of course, the quickest way to protect small areas, such as the business district of Kansas City, is to construct high levees that will withstand the onslaught of the greatest flood in history. If such levees are to be constructed, they should be financed at the expense of the persons and businesses benefited, since their construction will increase the flooding of adjacent areas and cannot be considered as the answer to the flood problem. Naturally, when a portion of the flood plain is protected from floodwater by a levee, the remainder must carry the entire volume of floodwater.

"Human nature being what it is, business interests will always endeavor to obtain individual benefits at public expense. Actually, the location of businesses on a flood plain consitutes a calculated risks, or at least should do so. There is ample acreage available in the United States for all business operations to occur well above floodwater. Unless there is saving in time and money that justifies the location of packing houses and other commercial activities on the flood plain, they should be located outside of that plain. If there is a saving that justifies their location there, then such concerns undoubtedly have accumulated sufficient profits from their operations in the past to build and restore damage occasioned by the recent flood. Then any construction at public expense should occur only after consideration is given to the entire problem. The losses of the hill farmer through erosion and crop distruction should be given as great consideration as the losses of the man located in the river bottom in any expenditure of public funds. I invite your consideration of all alternatives before endorsing the construction of dams or levees as the solution of the flood problem.

"There is apparently an army of "do-gooders" trumpeting for so-called flood control on a vast scale, and soon. Some of them doubtlessly are guilty only of accepting false promises unthinkingly; others are plainly misinformed or uninformed; and still others deliberately ignore facts in their enthusiasm to spend your money and mine in big chunks. If we are to be saved from their folly, we must think and then act.

"I invite you to consider the following questions: (1) Can levees ever do more than to protect limited areas at the cost of increasing flooding of other areas? (2) Can enough dams ever be constructed to impound the cubic yards of water that flowed down the Missouri River Valley during the recent flood, except by covering virtually the entire flood plain? (3) Incidentally, is it not probable that these ardent advocates of dams are more concerned with increasing jobs, par-

ticularly in their own field; with providing more electrical power by Government; with expanding recreational areas, and with other byproducts of dams other than with flood control? (4) Should not our first and major action toward reducing flood damage be directed toward reducing the amount of runoff water ever to reach the river bottom rather than toward impounding the water or diverting its course after it reaches the lowlands? Preventatives have long been considered better than curatives."

Here is Mr. Heinkel's opinion: "I feel certain that the farmers of Missouri know more about how to control floods than the Corps of Army Engineers," F. V. Heinkel, president of the Missouri Farmers Association, wrote in the current issue of the Missouri Farmer.

"Perhaps this is not even a compliment to Missouri farmers, for the Army engineers have been spending millions of dollars and working at the job of flood control for 100 years, and this year we had the worst flood on the Missouri River that white men ever have experienced," Heinkel said.

"Major General Pick, head of the Army engineers, says simply that the way to control floods is to build dams and levees. Farmers know that dams and levees are not the sole answer. We know that floods, like wars, must be dealt with on many fronts," the MFA president continued.

"It is not enough to build dams and levees in the lowlands after the rain water has run off the uplands and swept down into the valleys. To deal with floods in that manner is to deal with effects and not the causes of floods.

"Floods are caused by the uncontrolled runoff of rain water and that rain water falls upon the uplands. Farmers reason, then, that the first place to start dealing with floods is on the uplands where the rain first falls upon the ground.

"The first objective should be to allow all the water possible to soak into the ground. Then slow it down on its way to the creek bottoms by means of terraces, contour farming, detention dams high up on the creeks, by farm ponds, reforestation of marginal lands, and all the other good soil-conservation practices.

"After all the water has soaked into the soil and the surplus has been slowed down so that it will be days before it reaches the main streams instead of hours, then the surplus must be dealt with by means of dams and levees. But the dams and levees won't have to be so huge and costly, and meanwhile we will have kept our irreplaceable and valuable topsoil in place while at the same time we're dealing with floods.

"Then wherever big dams are needed, and some of them will be needed, they should be so constructed as to provide all the electric power possible. Thus we can put the floods to work lifting the drudging burdens from the backs of mankind.

"I submit that the Pick-Sloan plan, which deals only with the rain water after it has swept down into the lowlands, and with its endless bickerings among the various Federal and State agencies that administer it, is inadequate to meet the needs of the Missouri River Basin.

Mr. POAGUE. And last, gentlemen, I desire to file an outline report of the surveys of the Osage and Grand River Basin in Missouri, which sets out very briefly the agricultural program as at that time set up and as we felt would be adopted.

(The outline report referred to has been filed with the committee.)

Mr. POAGUE. In conclusion I will say this: In our particular area—and I happen to live in the flatter part of that area north of the Osage River—we have since the PMA program—and prior to that had the AAA program—begun to offer some aid in soil rehabilitation and have seen a very marked change from the old erosive type of farming to the newer practice. I don't have any figures to give you in percentages but in my area the percentage of change is remarkable. I attribute that largely to the fact that the Government has set up these programs which have been an incentive to those farmers who economically or otherwise could not afford to buy the lime, fertilizer, or expend the money necessary for the grass, waterways, and terraces.

Someone said a while ago, and I believe it was the pastor, that those things are looking to posterity. Certainly in my particular area the land that has been farmed for more than a hundred years, in many instances erosion had become a serious problem. Certainly siltation is a serious problem. The Lake of the Ozarks extends down the Osage River for 110 miles. So you already have an impoundment there of 115 miles of shore line. This large dam is proposed to be constructed less than a mile from the head of the Osage River. We found there has been some question about how quick these reservoirs would fill up with mud. Well, I don't know. I have heard engineers' figures on it, and I accept them, but they found this problem resulting at the head of the reservoir, and it is due to the lack of full, complete soil-conservation measures: They had found at the head of the Lake of the Ozarks where the water that comes down the Osage carrying that great load of siltation, still water, that they have a tremendous siltation, and today there are pending in the State of Missouri a number of lawsuits against the Union Electric Co. because the siltation above the lake has been so great it raises the bed of the stream to the point that farms that were not condemned before, because they didn't believe they had been affected by the overflow, are now being subject to overflow of water and change of channel. So we have all of those very serious problems that are tied in together and made an integral part of soil conservation.

If we don't follow the practices recommended in House Document 353 or 373 and the Young report, if we don't wake up and, with such Government aid as we can get, intensify the practices that are now being followed with some great success, we will ultimately reach the point where multiple dams will be ineffectual.

We feel most strongly about what is done in the Osage Basin. People down there would like to have assured to them a definitely concrete, spelled-out, dollars-and-cents program and assured to them, if possible, so that they may know from whence they are going in the event dams are built along their streams. Thank you very much.

Mr. HOPE. Next is Frank George, Lebo, Upper Marais Des Cygnes Watershed Association.

STATEMENT OF FRANK GEORGE, REPRESENTING UPPER MARAIS DES CYGNES WATERSHED

Mr. GEORGE. Mr. Hope and gentlemen of the committee, it is really a great pleasure to be here this afternoon. I have known the vice chairman for years, and I think I have told everybody in the State of Kansas that Kansas owes more to him than any other man in the State of Kansas in soil conservation.

I don't believe the great number of people in Kansas can conceive the great success and great advance that has been made in soil conservation in the last 20 years in Kansas.

Now, my name is Frank George, and I live 50 miles south of Topeka on the Marais Des Cygnes watershed. It is the garden spot of the world. My father drove an ox team with a train from Westport Landing to Denver and back in the sixties or late sixties, and he crossed through the Marais Des Cygnes watershed about 20 miles south of Topeka through the upper part. He thought that was the greatest part of the world he had seen. He came back later and

followed down across the Marais Des Cygnes to the south side. The Marais Des Cygnes River used to be, all the upper part of the basin, used to be Fox Indian Reservation and until the late sixties or about 1870. Now, I am here representing the upper Marais Des Cygnes. I am going to confine my remarks strictly to that. The gentleman that just preceded me, I am grateful to him. He took up the Osage Basin. Well, it is the Osage River—after it gets into Missouri and in Kansas it is the Marais Des Cygnes. I will assure you that this committee, and I understand they don't have the say-so or anything, but this agricultural committee is pretty powerful when they get going right good. I have seen them do a lot of things. But if this committee will help out the upper Marais Des Cygnes Basin, we will assure them there is a lot of Kansas water that won't be dumped down the Lake of the Ozarks.

The upper Marais Des Cygnes starts down here about 15 miles below Topeka, 16 miles, the basin, and it is 25 to 30 miles on south; two-thirds is on the north side of the river and probably a third on the south. Our basin covers from about what you call the upper Marais Des Cygnes down to about the Frankin and Osage County line. As near as the figures we have, that covers about a thousand square miles. Now, dams are proposed on the main stem of the Marais and on down 110 miles. There is nearly 107 square miles of this watershed that is above those two dams.

There are a lot of acres, thousands of acres of the most fertile land in Kansas covered. There are some ranches where the improvements on them run into thousands of dollars that are affected. We have organized and have a State charter, have started out to get all of our entire watershed in soil conservation; over 75 percent was in when we started. In the south part of Osage we have got promises on that in the last week, to where there will be 90 percent.

I don't want to take up a lot of time, but our proposition is simply, first, soil conservation. We are very grateful to the Department of Agriculture and Committee on Agriculture for the assistance in lime, phosphate, and other things to grow grass and improve the fertility. We contend a great deal of this water can be kept in the ground. Now, one speaker said, or it has been said, not more than 60 percent. We don't deny that, but we do say that if we have retention dams every bit of the water except maybe excessive rainfall and right down to the bottom can be retained.

Now, I don't speak without knowing a little about it. I am no engineer or anything, but we started back in 1935, got one of the very first CCC camps in Coffey County, in the State of Kansas, and started out with the soil conservation. My farm was one of the first that was fully put under the soil conservation development, and my neighbor came up and said, "Why, Frank, you're not going to let them go in there, the engineers, on that farm?" "Yes," I said, "the whole thing." "Why," he says, "they'll ruin it. I wouldn't think of it." "Well," I said, "it's going to be ruined without it." So they went in. Well, when he saw my farm he called the county agent. They spent a whole day going over that farm, and the next morning he called up the soil conservationist at the camp and said, "Come up. I want to sign up my farm right away." Well, we had every farm in that community signed up right now and it has all been terraced. Wherever we have retention dams they have held and they have worked.

Now, we know what we are doing and I don't want to take up any more time because we are going at this and going to push it and going to be in Washington with our entire program and hope to get it through, and when we do we want to promise the gentleman from Missouri that we will stop our part of the water. I want to say that $2 million has been estimated for the construction of these two dams on the Marais Des Cygnes and a hundred ten thousand in Osage County, and if that is over the old estimate—and anyone knows it will take twice that much—and if you will give us anything like the $20 million, we will build thousands of retention dams and we will guarantee we shall have no water going down to Ottawa. I thank you.

Mr. HOPE. A. J. Thomas, Silver Lake drainage district.

STATEMENT OF A. J. THOMAS, REPRESENTING SILVER LAKE DRAINAGE DISTRICT

Mr. THOMAS. Honorable committee, ladies and gentlemen, I represent a very small drainage district about 12 miles west of Topeka, organized in and started to work in 1943. This district contained five-thousand-seven-hundred-and-some acres. It is north of the Union Pacific Railroad tracks out there and a number of you go through that district coming to Topeka, in fact all of you, or by the southern edge. We had runoff water from the hills that came down and left over the railroad tracks from Silver Lake on into North Topeka. This ditch that we have conquered out there is a tributary or was originally a tributary to Soldier Creek, which you have read quite a bit about here in North Topeka in this recent flood. We started out first with a WPA pond which showed us—that is, before the district was organized—how much slower water came down from a spillway, and before the pond was constructed, where it came down in 2 or 3 hours, to empty this watershed which was a little over 300 acres, it took it about 36 hours. We conceived the idea just sitting around the garage stove that if we built a little pond on a larger tributary and put a tube through it so it would be dry, that we would accomplish more. By subscription we built our first pond which consisted of 10,000 yards, and I think there were about 12 farmers and tenant farmers who contributed to that pond. There were 720 acres of runoff above this pond. We let the water out through a 2-foot tube.

Well, we have had as much as 5 and 6 inches of rain in 12 to 24 hours there and not had a serious situation, water came out of the spillway of our pond. We have 12 ponds and sand traps down this 5 miles. This is pretty valuable land. We were completing the last one this fall. We started just below the point of soil conservation and not at the mouth of the stream, but far enough up the stream so we wouldn't have two floods on the one stream at the same time. We figure we have spent something like $25,000 in 10 years. We were getting the job done in a pretty fair manner. We have our system and it worked fine this year until the Kaw River went from bluff to bluff and ran right over our project. We think for our benefit and the benefit of the people below us and all that the dikes should not be too high, nor too narrow, nor the bridge approaches too high or too narrow. When we hit major floods these dikes should be far enough back to not bottleneck this water and the bridge approaches and all. Thank you very much.

Mr. HOPE. Charles V. Whitford of Nevada, Mo.

Mr. WHITFORD. Mr. Chairman and members of this committee, I have contacted a lot of farm owners and land owners along the Marais Des Cygne, Osage, and Grand Rivers. I think the best thing that can be done in respect to these flood-control structures is to start, to begin before the water falls and do all we can to hold the water there in the soil. That is the purpose of terracing, to keep the soil where it is, because, after all, when the soil leaves it does not do us any good any more, and we need more today to build up our natural resources because I think that the records will show that for every hour of the day, 24 hours a day, one-fourth of an acre farm goes down the Missouri or Mississippi Rivers, and that ground is lost. Yet our population is increasing at the rate of about 2 million people a year. The top 6 inches of our soil is our first line of defense. I think they should give credit to the PMA for doing what they did and starting what they started to do, building farm ponds and terraces and they have done a magnificient job, and it must be continued and flood control should start where the PMA leaves off. I thank you.

Mr. HOPE. Mr. Hawkinson.

STATEMENT OF J. A. HAWKINSON, BLUE VALLEY STUDY ASSOCIATION

Mr. HAWKINSON. Mr. Chairman, members of the committee, we are indeed pleased to have you people here today so we can give to you the grass-roots facts as you are getting them from project to project, watershed to watershed. I am J. A. Hawkinson of the Blue Valley Study Association.

I am not going to mention Missouri River Basin because I am only going to talk a very few minutes and I am going to confine it to our own controversial problem that you have heard so much about, the Tuttle Creek Dam. I understand you have got two or three dozen letters back in Washington in regard to that $5 million that might be appropriated for the beginning of that dam. I was very interested before noon in some of the discussions in regard to what really constitutes flood control, where it should start and, or where it should end, and after 12 years at the head of our association in the Blue Valley, between Manhattan and Lincoln, we are very convinced, in fact it is almost unanimous up there, that a large dam, in fact the largest proposed dam in Kansas is proposed down at the mouth of a stream where the watershed, 280 miles, extending 208 miles above it. In Kansas we have about 80 miles of it and in Nebraska that State has the 200. I am sorry Governor Peterson left here. I wanted to tell him about that. The engineers have proposed the Tuttle Creek Dam as a project. I don't know what they mean, as a key project. It is a project of destruction because they have offered no watershed treatment above it for the 280 miles. They haven't proposed a single smaller reservoir neither in Kansas nor in Nebraska.

I hope you get that, can visualize that picture of a dam 160 feet high on the Blue, in that fine productive valley, with all its permanent people and all, from hill to hill. Now, we have the dam site, I can tell you that. In fact, when Colonel Neff was head of the Corps of Engineers we invited him up to take a trip up the valley. The crops

were lush and it was about as beautiful a sight as you could see. We got to Marysville and had our lunch, and I asked the colonel, "What do you think of our valley?" and he says, "It is the finest I ever saw." I thought we had the job done, and about that time he said, "Bill, listen, it is about the best dam site you ever saw, too." So that has been our problem. We have a wonderful dam site but above that dam site we have nothing but destruction.

At the present time the Corps of Engineers are proposing 31 other dams in Kansas. I want to ask you a fair question. Where do we go from here? Six hundred of us moving out of that valley. They are not Okies altogether. The fellows that settled there are successful. Their children are there today and well-to-do people. They are permanent. And they are asking that we all move out, as Governor Peterson said, so that Kansas City, Kans., can have a flush bowl in the Tuttle Creek.

When Schoeppel was Governor we were talking along then about Tuttle Creek like we are now and we had a meeting with Andy down there and George Knapp was there, our water resource commissioner, and we told him the set-up, and Andy said this, "George," he says, "do you mean that they are trying to make a flush bowl out of Kansas?" and he finger-pointed it out like this [indicating], and George says, "Yes, we might just as well consider it," and he said, "George, it is going to be a long time before we are going to be a Kansas City flush bowl." But apparently he has changed his mind. I merely want to state these facts that you might get a picture of what the Engineers think and what we think.

We think soil conservation practices beginning at the head of these streams in Nebraska and bringing them right down to us, our creeks and tributaries leading into the Blue, will cut off enough of the top water that there will never be a flood. Yet we are confronted today with facts. I don't know whether General Pick either doesn't know what he is saying or doesn't understand it—or there is something wrong some place—when he gave on his transcription before your committee in Washington the fact that "Had we had Tuttle Creek, Manhattan would be dry tonight." And the Kaw River was flooding it from the south, 15–20 feet deep, the Blue a mile and a half below Manhattan.

When the Kansas State Control Association met at Topeka, I was a member of that delegation, and that afternoon in the paper General Pick quoted to a committee in Washington that, "Had we had Tuttle Creek, Topeka wouldn't have had a flood." And you could drive from here on 75 for a mile and a half and find that the water was 15–20 feet deep, and the paper stated it traveled at 30 miles an hour. It would have filled as many dams as you would build on the stream.

Gentlemen, I am agreeing with what has been stated here today, that a disastrous flood like we had, with a flood like that, soil conservation won't prevent it, not altogether. It would take a lot of it but it wouldn't prevent it, nor will all the big dams you can build. Big dams have their problems too. I am a farmer living up in the valley and took the place of my father when he retired. Today I have retired and I still live on the farm but my son is operating the farm. We have livestock and farm like everybody else does in that valley. We realize that should the dam be built and we move out we will have only partial payment by which we can go out and relocate, and that extends from Manhattan on up, and every farm unit will be broken up and they

will retain ownership on the waste ground and on the hills and Pick will take the tilled ground and we couldn't even keep a milk cow. We're kicked out. Why not try the soil conservation program, see what you can do with retention dams, such as the Washita or the Sioux project and try to make the valley and the plains better instead of inundating them and saying, "Go on, Oakies, find a place wherever you can." We need the 60,000 acres, not because I live there but because it is a very good productive part of Kansas. We think you people in Washington, the Department of Agriculture, can help us make it still better, make it permanent, more permanent than we are today. I would like to submit these few lines and then I am through. [Reading:]

BLUE VALLEY STUDY ASSOCIATION,
October 31, 1951.

Representative W. R. POAGE,
Chairman, House Subcommittee on Agriculture,
Topeka, Kans.:

We, the people and land owners of the Big Blue River Valley, a tributary of the Kansas River, unanimously oppose big dual-purpose dams, located at the mouth of the watersheds and propose that your committee, with the Honorable Mr. Poage as chairman, and the Congress of the United States instead adopt a policy of watershed treatment consisting of terracing, water ponds, grassland seeding, with retention and "big open dams" where needed.

The proposed Tuttle Creek Dam is too destructive in the inundating of 55,000 acres of fertile, nonerosive land, the loss of seven urban towns, its railroads, schools, and agricultural production, with the loss of an annual reoccuring income of $6,635,977.

The Blue Valley Study Association, at this time, has a Kansas State charter permitting us to set up a soil conservation and watershed district, composing the Big Blue River watershed, from the Nebraska State line to the Kansas River at Manhattan.

To eliminate big dams, and adopt watershed practices will permit 600 permanent farm families and seven towns to remain in this valley.

Our Kansas 1949 Legislature passed a resolution asking Congress to delete the Tuttle Creek Dam project from the Pick-Sloan plan.

Deposit of silt, on our low ground convinced us that, erosion had left a deposit of 12 inches of silt during the July flood. This topsoil has left the Kansas and Nebraska watershed and is gone forever.

We are faced with two serious problems in Kansas at the present time:

1. Losing our topsoil by erosion which leaves our land gullied and full of ditches and completely unproductive.

2. The Corps of Army Engineers, advocate only big dams that will inundate all our nonerosive river bottom land. This proves we must have a watershed treatment program.

Prof. J. O. Jones, hydraulic engineer, of Kansas University, stated at our Kansas State Chamber of Commerce meeting at Tepoka in July 1951 that the Big Blue River only added 10 inches to the crest of the flood at Topeka, and that flood damages at Kansas City, Lawrence, and Topeka would have been the same—Blue River or no Blue River.

Therefore, give our people soil conservation, retention dams, and watershed treatment, and save an annual reoccurring loss of $6,635,977.

In England they say, "God Save the King"; in Kansas, we say, "may God Almighty and Congress save us from the Corps of Army Engineers."

BLUE VALLEY STUDY ASSOCIATION,
J. A. HAWKINSON, *Director.*

We are for flood control. It has been said we are anti-flood control. That isn't true. We feel just as sorry for North Topeka and Kansas City as anybody. In fact, we lost quite a lot of our low ground right there on the Big Blue. We didn't lose a life or home, nor did they lose a bridge, and yet General Pick says, "We must have Tuttle Creek." We sent a questionnaire out to everyone of these 600 farmers request-

ing information on how many cattle they had and how many chickens and eggs and how many in the family and everything, and we got 67 percent back and thus established these figures on that questionnaire, and I think that is recognized as a pretty good estimate on the questionnaire, 67 percent.

Erosion had left a deposit of 12 inches of silt during the July flood. I measured that myself and the main stream carried more silt than that.

Mr. HOPE. Thank you very much. John Redmond.

STATEMENT OF JOHN REDMOND, NEOSHO COTTONWOOD WATERSHED

Mr. REDMOND. Gentlemen of the committee and members of Congress, and Kansans. I want to apologize to the committee. I came on short notice. The one who represents the Neosho Cottonwood Watershed said he could not come and I started to work on my notes at 12:30 and left home at 1:20 and I went to reach into my pocket for the notes a few minutes ago and they are gone. I have moved around about six times since I came here and I may have dropped them somewhere.

First, I want to thank the committee as Members of Congress for what they have done. Now, for the Neosho. I think our watershed is somewhat different from those on the Missouri Basin. We are in the Arkansas Basin, and we are glad that Congress authorized a complete survey of the Arkansas, White, and Red River Basin. It sounds good to us. I want to thank Frank George for his mention of soil conservation. It happens that I was chairman of the committee that got it. I believe thoroughly in soil conservation. At our hearing before the House Public Works Committee in 1949 we strongly advocated the adoption of the Soil Conservation Service survey of the entire Neosho watershed, which we understood was completed some 2 years before that, more than 2 years ago, now, which has since been in the hands of the Secretary of Agriculture. We want soil conservation and we want the major dams on the Neosho. We have had the peculiar situation of 65 inches of rainfall one year and 16 in another. Quite a variation. We have had floods like this 1951 and we had 49 days during which there was no flow on the Neosho pass some of the cities on the lower part. The cities relied on sewage from towns above them for their water supply; and, to tell the truth, they don't like it. The plans are complete. We are very anxious. We are anxious that Congress shall at this next session give us the appropriation for the planning of the other three dams and for construction on our main one. Every city governing body on the Neosho and Cottonwood, and so forth, with the exception of one, favored the construction of these four dams as contemplated by the report, the report of the Army engineers. I confess there was some strenuous opposition in some of the towns—Council Groves and Marion, both, where they were practically wiped out. We had some opposition, but presented a petition from more than 9,000 people in the valley, and most of them, practically all of them, asking for this service.

The first dam was built about 25 years ago, when the Government paid only a very small part of the dam. We have been for them ever since. We want to call the committee's attention to the fact that on

the Neosho, at least on the Cottonwood, nearly all of the families in the flooded area following this year's flood have moved out. Some of them have gone to the cities and some moved to the neighboring towns and some to other States, but they have moved out of the valley.

I would like the permission of the committee to write a short statement with provisions and some additions probably and mail to you at Washington. I just want to say that we are strong for coordinated soil-conservation and a flood-control program. We have very little interest in irrigation, navigation, or power which is not covered in our watershed. But we do want protection. I thank you.

(The following statement was submitted by Mr. John Redmond:)

STATEMENT OF JOHN REDMOND, BURLINGTON, KANS., PRESIDENT OF THE NEOSHO-COTTONWOOD VALLEY FLOOD CONTROL ASSOCIATION

Chairman Hope, members of the committee, visiting Congressmen, and Kansans, my name is John Redmond, of Burlington, Kans. I am here representing the Neosho-Cottonwood Valley Flood Control Association, of which I am president.

First, I want to thank the committee for giving the people of Kansas this opportunity to have a personal contact with the committee and to express their ideas on this important question.

The organization I represent has steadfastly favored the coordinated flood-control and soil- and water-conservation plan authorized by Congress in the Flood Control Act, with the work of the several Federal agencies supplementing and complementing each other. We understand this act to place the responsibility for flood control in the lands of the Department of Defense and soil and water conservation in the Department of Agriculture. We appreciate the splendid work done by these agencies in the Neosho watershed and urge that their complete plans be put into effect at the earliest possible date.

At the hearing in May 1949 before the House Public Works Committee we on the Grand-Neosho strongly urged the adoption of the Soil Conservation Service plan as outlined in its complete survey of the Neosho watershed, then in the hands of the Secretary of Agriculture. It is our understanding that this complete survey with very few changes now has been passed to the Bureau of the Budget by the Secretary of Agriculture and we have been and now are urging its authorization.

At the same time we urge that the Federal Government assume a larger share of the cost of the so-called "dry dams" and other parts of the plan which are of benefit to property downstream as well as to property in the taxing district that builds them. We think this only fair to owners of land in the taxing unit.

The Neosho (Grand) and its tributaries furnish one-fourth of the floodwaters of the Arkansas River into which it empties, although comprising only one-thirteenth of its area. Those figures were established before the record-breaking flood of 1948 or the granddaddy 100-year flood of 1951. You have seen what the Kaw River did at Topeka, and we call your attention to the fact that the peak discharge of the Neosho at Parsons, Kans., in July 1951 was practically 10 times that of the Kaw River at Topeka in proportion to the area drained, according to the figures of the United States Geological Survey.

We need reservoirs for control of floods on our watershed and we need conservation pools in those reservoirs for dry seasons when the river runs dry. Fourteen cities in Kansas depend on the Neosho for their municipal water supplies, and there are times when the stream is dry. In 1936 there were 49 days of no flow at Parsons. The cities located on the lower river used and reused water one after another. The water going in through the water mains and out through the sewers was treated and used again and again by suceeding cities down stream. Not a pleasant or appetizing thought! Certainly not a sanitary condition.

While the rainfall on the Neosho watershed in Kansas averages about 40 inches in a year, the rainfall is very irregular. In some years about 85 percent falls in 6 months, leaving only 15 percent or less for the other 6. The rainfall has varied from 65 inches in one year to 16 inches in another, showing the urgent need for reservoirs to control floods and for storage of water for use in dry seasons. (See chart attached marked "Exhibit 1".)

We favor the use of retention dams on the tributaries as recommended by the SCS and we favor the multiparpose dams for flood control and conservation pools

as recommended by the Corps of Engineers, and full use of all reservoirs as planned by the Congress.

Your attention is called to the little brochure attached to this statement, marked "Exhibit 2," giving in detail more facts to support our request for consideration and funds for planning and construction.

In the weeks since the July 1951 flood, scores of farm families on the Neosho have moved out of the flooded area, going to the nearby towns, to the larger cities or to other States. Practically every farmstead in the proposed reservoir areas on the Neosho was flooded by the 1951 flood, and most of them by many previous floods. It is estimated that there now is only one farmhouse in the flood plane of the Neosho where there were at least 20 a few years ago.

I realize that practically all of the discussion here today is by those interested in conditions in the Missouri watershed, where conditions are very different from those in the Grand-Neosho watershed in the Arkansas Basin. We suggest that very few of the arguments against recognized forms of flood control presented here today are applicable to the Neosho watershed, where the farmers and landowners and the cities along the stream have been endeavoring for years to get reservoirs on the main streams and all other possible relief and where the SCS and Army engineers cooperate with us. We asked for dams years ago when local communities had to bear a sizable part of their cost.

Council Grove, Marion, Burlington, Iola and other cities on the river have spent sizable sums for flood prevention and to insure and protect municipal water supplies, but it is an impossibility for them to prepare for such emergencies as the July 1951 flood. They urgently need the protection from floods the proposed dams will give them.

We in the Neosho, Verdigris, and other small watersheds in southeastern Kansas appreciate the action of Congress in authorizing a complete survey and report of the combined Arkansas, White and Red River Basins as one basin.

We deeply appreciate the opportunity of presenting our ideas to this committee, and the interest shown by its members in coming to Kansas for this hearing.

Mr. HOPE.—Mr. Christopher, Amoret, Mo.

STATEMENT OF GEORGE CHRISTOPHER, AMORET, MO.

Mr. CHRISTOPHER. Mr. Chairman, Congressman Poage, I am very glad to have the opportunity to make just a few remarks, and I will make them very brief. I want to begin by thanking the gentlemen of the committee for their very kind treatment of me today and the opportunity they have given me to make a statement here. I am not in opposition to these big dams as such, but I believe that it will be a calamity if those dams are constructed before the absolute need of them has been determined and demonstrated beyond any point of doubt. I am not going to talk to you about something I don't know anything about. I am not an engineer; just an old farmer from over in Bates County, Mo., about 40 miles west of Haysler Poague and just a short way from the Kansas border, and 14 miles from the banks of that awfully crooked Marais Des Cygnes. There is a little creek out there in my neighborhood; drains 1,380 acres of land, about 3 miles long—well, not miles, just a little creek. Twenty years ago that creek reached a maximum depth of 6 feet when there came a 4- or 5-inch rain in a period of a few hours. It has rained just as much this year in that little creek as it has rained in Topeka or any other place in the basin of the Marais des Cygnes River, and that little creek has not reached a maximum depth anytime this year in excess of 4 feet. Now, why? There are 25 miles of terraces on the watershed of that little creek, and if there were 10 more miles of terraces on the watershed of that little creek every acre tributary to that little stream would be terraced. Those terraces are so built that they carry the water back upstream as far as it can be carried and slow the runoff of that water down and the water passes either over concrete drops or through pipes

with concrete "morning glories" at the top and retains that water on the land behind the terraces and lets it down in an orderly fashion. Some of the land has been sowed to a good improved pasture mixture. Soil conservation has been practiced on the watershed of that little stream, and it has almost cut the maximum depth after a flood in half. If it will work on that little stream that drains 1,280 acres, it will work on a stream that drains 12,800 acres. It is just a matter of size. The only difference between the Marias Des Cygnes and the Missouri River is that the Missouri is bigger. That is the only difference.

Before we build these giant dams, if we build them at all, the land should be terraced. The acres that are no longer useful for agricultural production or grass should be reforested. The land that is only fit for grass should be returned to grass, and I am confident that if and when that is done we will have so much flood control with the soil conservation that we will not need so many of those dams and there won't have to be built dams so high. If after we have done these things, if after we have begun at the top of the ridge at the divide and checked the silt, terraced our land and reforested the land that must be reforested, then if we need dams I will be the first man to say to build them. The population in these United States is increasing at the rate of 5,000 a day. That means we will need 5,000 more breakfasts in the morning. We haven't got any other Kansas to flow up; we have no other river valley to despoil. We will have to go to the same old fields we have been going to for the past five decades and say, "Give us bread." Twenty-three miles of those 25 miles of terraces belong to me. Why did I build those 23 miles of ridges that my neighbors said I was a blinkety-blank fool to construct? I wasn't thinking of flood control; no. I was thinking of saving the topsoil on land that had been planted to corn up and down the slopes at least 25 times more than it ought to have been. I was forced to terrace my land, and I learned by watching the effect that I was getting, not only soil conservation but flood control, and if it was practiced all over the watershed of the Marais Des Cygnes the drainage ditches that have been dug down in my county would carry the water.

Mr. HOPE. Thank you very much. Mr. Harry Crane.

STATEMENT OF HARRY CRANE, REPRESENTING TRICOUNTY DRAINAGE DISTRICT

Mr. CRANE. I represent the Tricounty Drainage District from Silver Lake, on the Kaw. It runs 13 miles along the river, and in that district there are 10,500 acres of as good land—was before the flood—as you can find in the Kaw Valley. Today it is a wreck. You folks that drive through or live there know whereof I speak. I know that members of this committee know the same thing because they have been over it. I also speak as an individual that has one of the farms in that area. We haven't been able to get our tenants back into their houses because we can't get help or even get into them. The roads are out and we can't make it. We are just one of the group. There are others all the way up and down. We have a serious problem, and it is not a question of being just flooded. Anybody can lose a crop, but when your land washes into the river or the sand is 3 feet deep that is another thing. I don't know what can be done.

We have had a little help and we appreciate it. The Corps of Engineers, which I find are very unpopular from Mr. Hawkinson's talk and several others, have rebuilt the dikes. They met earlier this season and said they would try to have it done by Christmas. They are practically finished in the Tricounty district and have done a good job and we appreciate it. It is just that we are not able as taxpayers to meet the replacement of those dikes. That would cost at least a hundred thousand dollars. Many people won't be able to pay taxes. Many don't have any land upon which to pay taxes. There wasn't much use to plant wheat or do anything this fall until the dikes would be there.

It seems to me we have got to think about this as an over-all program. I don't think any one feature that has been suggested will do it alone, but we have reason to believe the three features that have been suggested probably will do it. Certainly no one takes any objection to soil conservation and retention dams, small retention dams. That is certainly good. No one complains about that. Certainly we need river bank protection, and we need dikes; and I think in addition to that we need some dams. I have no truck with the idea of irrigation. We are purely concerned, in our area at least, along the Kaw, with flood protection; and, if those dams were made dry dams and not be so big and could be made so as not to hurt the land, that is certainly fine. Those farmers that live there have gone back three generations on their farms, like the ones on the Blue. They like their land and hate to see it wrecked like it was this year. So, it seems to me—and I am not an engineer, so I am not going to try and talk like an engineer—you have got to rely upon people who are supposed to know what they are doing. But it seems to me the three features are absolutely needed and that not just any one of them will do the job alone.

I want to commend the Blue River Association for their stand on the Tuttle Creek Dam. I have relatives up there that have taken the hide off me because of my thinking on this thing.

There are folks that have lost land and have no recovery. There has been a point raised that they will not be adequately compensated for the land taken. There are always arguments, but if we don't have an confidence in our jury systems and court system, and trial by jury, if we are not satisfied, then the whole system of our Government breaks down. I naturally feel there probably would be adequate compensation. Now, I don't think any more land should be taken there than necessary, nor do the farmers that I represent; but, as between the two, they would much prefer the Pick-Sloan. We are not concerned about power. We don't care whether anybody can go fishing down there or someplace else. We would like to be able to save the farm and have that to work with. So I would suggest to the committee that, as far as the Tricounty Drainage District is concerned, they feel the plan must be threefold. They have set the resolution back as far as 1948 and sent it to all Members of Congress, and recently the same type of resolutions have been sent in again. They didn't know about this meeting until it was in the paper this morning, but I know that is their attitude. It is just a question of all working together to see what is best to do. With that, I thank you for your time.

Mr. HOPE. Mrs. Gaylord Johnson.

STATEMENT OF MRS. GAYLORD JOHNSON, BLUE VALLEY STUDY ASSOCIATION AUXILIARY

Mrs. JOHNSON. I am Mrs. Johnson, housewife, and with the womens' auxiliary of the Blue Valley Study Association.

The Women's Auxiliary of the Blue Valley Study Association helped to promote the formation of the Blue Valley Watershed Association of Kansas. We believe this is the flood-control program that will protect everyone and at the same time save and improve our soil and increase the Nation's agricultural output.

To us, the watershed program means stopping the water where it falls and slowing the descent of what does run off by proper grassland usage, terracing, contour farming, farm ponds, retention dams in the waste land of the gullies, and draws and dikes and levees on the mainstream rivers. There is no destruction of land in the watershed program, only land improvement.

Stop the water where it falls, at the grass roots, and it becomes less necessary to dam up muddy water in mainstream dams which will destroy rich farm land. Eastern Kansas is a land of hills and valleys. Dam up the valleys and what do you have left? Where would these flooded-out farmers go to find new farms?

Help us put the watershed program to work in the Blue Valley; then the people from Manhattan to Kansas City will be protected from future Blue River floodwater and we will still have our farms to add to the agricultural output of Kansas.

Give us a flood-control method that will work for the people, and the people will work for this method of flood control.

Mr. HOPE. We thank you very much. Mr. Kilker.

STATEMENT OF C. C. KILKER, KANSAS STATE CHAMBER OF COMMERCE

Mr. KILKER. I am C. C. Kilker, Kansas State Chamber of Commerce. Mr. Chairman, members of the committee, I am secretary-manager of the Kansas State Chamber of Commerce, a private organization made up of 2,500 business firms, local and State-wide organizations and individuals Our headquarters are here in Kansas. I represent the State chamber today, and particularly its flood-control council. I am not here in the role of an expert on the technical and engineering aspects of flood control, and the part that soil and water conservation has or can have in such a program. Rather, I am here as an individual and as a representative of an organization which is vitally concerned with the economic aspects of flood protection, and soil and water conservation.

For years, many people and many groups in this State have been interested in various types of flood-control programs.

Unfortunately, however, we never were able to get together among ourselves and settle upon a program to which we could all agree. The existence of this diversity of opinion was directly responsible for the formation of the Flood Control Council of the Kansas State Chamber of Commerce.

This group of approximately 45 persons held its first meeting in Topeka on August 14. Every effort was made to make certain that

every conceivable point of view regarding flood control was represented on that council—and when those 45 people sat down around the table on August 14, I dare say that there were pretty close to 45 different opinions represented. There were only three things on which everyone agreed. First was the fact that we do need and want flood control; second was the fact that everyone on that council, and the groups they represented, opposed the establishment of a Missouri Valley Authority;, and third, was the fact that all recognized the importance of and need for a complete soil- and water-conservation program.

If I were speaking personally I could do so and it might be more interesting than what I am going to read, but since I represent a State-wide organization in Kansas, I feel impelled to stay with my manuscript because it has been carefully prepared. Approximately 45 persons met in Topeka and the statement bears the signature of these 45 men, and, as Mr. Crane pointed out, he is one of them, and Mr. Hawkinson and Mr. Tweet and others. After a day of discussion, debate, and presentation of all sides of the matter, the statement, which I now shall read to you, was formulated. This statement was later adopted by the board of directors of the Kansas State Chamber of Commerce and is, therefore, the policy of our organization concerning flood control. I quote from this statement:

The Kansas State Chamber of Commerce Flood Control Council recommends that the plan for flood protection include soil conservation, reservoirs of a suitable kind on upper tributaries, suitable reservoirs to protect the main streams, levees, and necessary bank stabilization.

We urge that the program of soil conservation be accelerated and that such plans be made a major part of our flood-control program; the importance of retention dams on tributaries as a significant part of the program; that the program of construction of suitable open and multiple-purpose dams as recommended by the Bureau of Reclamation, Corps of Engineers, and the Soil Conservation Service be continued; that the recompense to displaced owners be made very liberal to the extent that they will feel willing and able to set themselves up elsewhere; the Congress to appropriate sufficient money to accelerate studies and planning on the Arkansas River Basin in Kansas; that suitable levees with necessary bank stabilization for thir protection be constructed; that sufficient appropriations be made for continued study of all phases of the flood-control program in Kansas.

Admittedly, gentlemen, this is a rather broad and a rather general statement. It is so because it is as far as the representatives of the varying points of view concerning flood control were able and willing to go at the time. Nevertheless, it is, in my opinion, a significant statement—because it defines the broad areas of agreement within which all persons in Kansas are ready to work together. It is a definite step toward unification of thinking. I believe that that step is of interest and importance to the members of this committee. We in Kansas recognize that one of the first things that must be done before we can expect the Congress to provide a sound flood-control program is to unify our own thinking. I submit to you that this statement which I have just read is proof of a step toward such a unity, and that we now have the right to expect the Congress to record similar progress on the development and initiation of a flood-control plan.

Because of your particular interest in soil and water conservation as they relate to flood control, I emphasize the attention given by the Kansas State chamber policy to the matter of soil and water conserva-

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tion. We urge that "the program of soil conservation be accelerated and that such plans be made a major part of our flood-control program." We do not believe that any final plan of flood protection can be complete without full consideration being given to proper soil-conservation practices.

For example, if the final flood-protection program should contain dams and reservoirs, it still is a matter of plain and practical economics to prolong the useful life of these dams and reservoirs as long as possible. Proper soil- and water-conservation practices certainly would make a valuable contribution in this respect, because they would retard the siltation which very largely governs the life span of a dam or reservoir. This is straight economics.

Regardless of what plan of flood protection may finally be adopted, however, we urge that soil- and water-conservation practices be vigorously encouraged and stimulated.

Here in Kansas we depend upon the land. We ask your help in the preservation of our most valuable resource—the land itself. We ask your help in the development of a flood-protection program. We ask your help in opposing any move toward the establishment of a Missouri Valley Authority. At the same time, be again call upon the groups represented at this hearing today, and at other hearings of this and other official groups, to continue their progress toward the unification of thinking that will finally result in the formulation and implementation of the thing in which we are most interested: real, sound, practical, and humane flood protection. Thank you.

Mr. HOPE. Thank you. Next, Mr. William Edwards.

STATEMENT OF WILLIAM EDWARDS, IRVING, KANS.

Mr. EDWARDS. I am William Edwards, of the Blue Valley Association, a farmer actively engaged in the occupation of livestock farming. I not only thank you for coming out to Kansas to hear our story, but am grateful to you because you now understand better the problems with which we are faced in Kansas in securing authorization for the work which we have here today proposed. We realize you are thinking along the same lines as the group that appears before you.

It shall be my earnest endeavor this morning to express the thinking of hundreds of my farm friends in Marshall County in respect to watershed engineering and flood control. The actual physical location of my farm is very similar to that of so many of the farms in the Blue River Basin. Much of the farm's tillable acreage is located in the fertile river and creek bottoms, while the pasture ground and some of the cultivated upland lies in the adjoining hillsides. Being thus situated, we are well acquainted with both sides of the controversial issue as to the best means of controlling excess rainfall. We have repeatedly experienced, on our good bottom land and in some of our small towns, flood destruction from overflowing rivers and flash-flooded creeks. We have also seen our uplands becoming impoverished as heavy rainfall, when uncontrolled, carries off our fertile topsoil and leaves our land as gutted gumbo gullies. As we ponder this problem of destruction, realizing that not just our welfare, but that of our posterity and the entire Nation is at stake, we stand convicted that some solution must be forthcoming, and soon. More especially in recent years, we have gained the firm conviction that the answer lies

within our own grasp and reach, and not in the impractical ideas proposed by an outside agency. We must adopt and work together, with such assistance as our Government will give us through the Department of Agriculture, in a plan of soil conservation and watershed engineering. A plan, which in its fullest implications, will not only save, but improve the upland farm and pasture ground, and make more productive the bottom land in its control of the excess of floodwater.

This summer of 1951, those who dwelt in the flood plains and resided in the cities along our large rivers in Kansas, had their attention dramatically focused on the problem of flood control, as the aftermath of our destructive flood. A great hue and cry went fourth from them for protection from another such catastrophe. In the first flush of their frenzied fervor, they fell easy prey to the insidious postulation of Army engineers that protection could only be provided by the construction of large dams near the mouth of every main tributary to the larger rivers. No thought was given to the cost of such a program; to the great loss to the State, in such a plan, of highly productive farm land; to the injustice rendered to those living in the proposed dam sites who, necessarily would lose their homes, farms, business, communities, and all that they held near and dear to them; nor even to the practicality of the proposal. These unsuspecting victims of the flood failed to realize, that they who proposed such a preposterous plan in the name of protection were guilty of the most pusillanimous prevarication ever perpetrated on an unsuspecting victim since the time when the brothers reported to their father that Joseph had been killed by the wild beasts.

But as the city dweller dug out from under the thousands of tons of mud and muck deposited by the flood, there came to him the realization that the silt which he so thoroughly detested, had surely been productive earth from some man's farm. What to the city resident was a curse, had been a blessing to some upland farmer, the loss of which had not enriched the former and had left the latter poor indeed. To the observing citizen then, the problem of flood control grew in scope, and it became more than just a matter of trying to stop a vast quantity of water at a given spot. The solution must lie both farther upstream and downstream. Upstream, in a full and complete watershed-engineered land treatment that starts controlling the water where it falls and stops soil erosion before it starts; downstream, in allowing the engineers to construct protective dikes where they originally planned them, well back from the river's edge so as to leave the river sufficient channel to carry its burden of excess or floodwater. Such a plan might necessitate some relocation of man-made structures on the flood plain, but if so, considering the permanent protection resulting from such a movement, it would be a much more beneficial move than would the relocation of towns and farms from the site of proposed destructive reservoirs. For the large reservoirs built to impound the floodwater, would do nothing to stop the upstream farmer's soil losses which would continue unabated, rendering his farm less and less productive. At the same time, hundreds of thousands of highly productive river-bottom acres would be lost forever as they became part of a gigantic silt trap. And in both instances our State and National economy would be the worse for it.

As a township official concerned with the expenditure of public funds for the maintenance of local roads and bridges, I am increasingly aware of the unnecessary cost to taxpayers for road repairs and washed-out culverts and bridges, caused by local flash floods. This reoccurring expense is met from taxes, levied on lands constantly decreasing in value as they erode away. If much of the bottom land is taken in reservoir sites, then the taxation burden on the upland family farm will become even greater. An engineering plan calling for large reservoirs will in no way help, but only serve to aggravate the local township and county problems of roads and taxation. But watershed engineering will definitely help control rainfall runoff in such a way as to protect and save the local farm, and local public roads and bridges. The loss in dollar value, to upland farms by erosion, is almost equal to the flood destruction losses in the flood plains and the cities, even in years of great floods. And the year-in and year-out upland soil losses is infinitely greater in value than flood destruction losses downstream. This becomes increasingly important when one realizes that soil-erosion losses are sustained, not for this year, or a few years, but are losses sustained forever.

We farmers in the Blue River watershed have already amply signified, especially in my county of Marshall, our interest in, and desire to have, soil-conservation work. Great progress has been made in the past few years, as figures presented to this committee well show. But as yet, we have made only a start. The main reason more complete watershed work has not been accomplished is because the demand for help, in the way of direction from our soil conservation district field men, has been much greater than their limited personnel and funds have been able to keep up with. The farmers in this area, together with most of the townspeople, are pushing for more watershed engineering work. We want it, we believe in it, we are convinced that such methods will save the land, and stop the water too. We are most grateful to the members of this committee, for the giving of their time and personal attention, in conducting this hearing out here in the Midwest, that we may present to you our thoughts and convictions in this important matter. In closing, may we impress you that we are urgently seeking your support and help in promoting a constructive watershed approach to our problem, and opposing a program promoting only large destructive dams. Thank you.

Mr. HOPE. Dean John H. Longwell.

STATEMENT OF J. H. LONGWELL, DEAN, DEPARTMENT OF AGRICULTURE, MISSOURI COLLEGE

Dean LONGWELL. Congressman Hope and members of the committee, I am John H. Longwell, of the department of agriculture, Missouri College. My remarks represent pretty well the thinking of several State agencies that have been concerned with the problems of soil conservation, flood control, water management in Missouri.

The plan for agricultural development under the Missouri Basin program is massive in outline, imaginative and intricate in detail. Its purpose is to accelerate the improvement of agriculture on lines both old and new. If the program succeeds in proportion to its size, complexity, and cost, the whole nation will be immensely benefited by the increased production and new wealth thus created.

We believe that it can succeed if liberated from the entanglements of competitive prerogatives and wisely directed in the public interest. Big as the Missouri Basin is, there is no room in it for indulgent overlapping and jurisdictional disputes among the many agencies entrusted by the people to carry out the plan. Assignments of duty should be clear, specific, and firmly held in place by authority inspired with a clear sense of responsibility to the public.

Means should be devised for coequal participation by Federal agencies on the one hand and agencies of the Basin States on the other. The general administrative scheme and its specific practical objectives should be agreed to by these cooperating units of Government.

Cooperation between the Federal and State agencies carrying on the basin plan is a basic necessity and it must have real meaning. It must be based on true intentions and faithful adherence to them, the essential components of a long-term pact working together in the public welfare. Merely an occasional exchange of favors for temporary advantage or convenience is only an illusion of the strong, sincere, and lasting agreement necessary for mutual aid in a great undertaking.

More than any other factor, the judgment of the people on the reason for the plan and the validity of its objectives will determine the ultimate success of the basin program. But if the majority of the people have heard of the program at all, they have only a vague notion of its meaning in terms of national and individual benefits. Surely the simplicities, at least, of a movement so potent in good returns to present and future generations should be widely told. And the telling should be done mainly by those who are closer to the people than members of the Government agencies employed in the project.

The reasons for each project should be simply explained; and above all, the estimates of actual costs and expected benefits should be published frequently, as work progresses, in forms and places convenien for public scrutiny and analysis. Surely the people, whose burdensome taxes pay for it all, have a right to know what they are getting for their money. And surely the program authorities are morally obligated to extend such information in terms the people can understand. Unless there is plain sense in the estimates of benefit and cost, the program will not long enjoy public confidence, and the loss of public confidence could dry up the program long before the end of its planned 30-year life. The public is not long tolerant of economic errors publicly known.

FLOOD CONTROL

Agriculture in the lower basin is vitally interested in the control of floods. All means yet tried for flood control are presently on trial. None has been found adequate in itself for either prevention or control on a large scale; but by contrast the size and frequency of floods have increased; and flood damage in recent years has reached enormous proportions, especially in cities. Indeed the whole question of floods has become critical, and public judgment on official efforts for protection against this great natural menace is not favorable, for the people have long been promised a substance but have received only

the shadow thereof. They are beginning to wonder whether anyone really knows much about large-scale control of big floods.

This statement (for the present hearng) is certainly not offered as a solution for the flood-control problem, but we do believe that the following considerations will be helpful in finding a realistic approach to it:

(1) Treat flood control as a single and separate objective and employ all known means for its accomplishment in places where only flood control is needed or wanted. Too often, flood control is used merely as a popular front to appease adverse public opinion of a multiple-purpose project, in which position it receives small support and renders small service.

(2) Estimate in terms of hard reality—terms the people can understand—the actual costs and expected benefits of flood control as a separate project. Submit the estimates to a neutral board of review in each State.

(3) Devise means by which the benefits of a dam may be extended to the people above the structure as well to the people below it. In a populous area there is presently a grave disparity, undemocratic and unjust, between the effects of a dam upon these two groups.

(4) Faithfully present the foregoing terms to the people and let them decide whether they want flood control at the quoted price. If they want it, try to give it to them.

(5) Organize the timing and related efforts of all means known to be contributive to the control of floods. Move the improvement of the uplands in unison with the construction of dams and levees. If in the public mind today there is a single unified idea on the means of flood control, it is this very one for coordinated and truly cooperative effort. Congress has provided by law for the general exercise of this principle, but responsible Government agencies have been lax in observance.

Can we actually control large-scale floods to a satisfactory degree, at a rational cost? We believe the answer may be found only by dealing directly with flood control as a separate project and moving on it in joint and concurrent effort.

RESEARCH

In carrying out the Missouri Basin program as a whole, a great deal of research will be found necessary. It will often provide a basis for estimates of costs and benefits, of cause and effect, of economic and social impacts, and of many other vital factors influencing decisive action by the agencies responsible for conducting a project. Such "action agencies," for the sake of their own clarity of thought, if for no other reason, should not themselves find the technical "facts" which may determine their own later action. The needed research should be done by established Federal and State research agencies. The people of the Missouri Basin States have confidence in the land-grant colleges whose research organizations and programs and familiarity with the agriculture of the States places them in position to be of especially great service in this program. Certainly it would be more appropriate, and perhaps more effective, if the facts are found only by those who will have no subsequent interest in their application.

Mr. Poage has already outlined very well the survey which has been made of the Osage Basin in Missouri. I would simply like to emphasize the statement made and call particular attention of the committee to the report which in Washhington and upon which we believe action in the near future should be taken. I thank you.

Mr. HOPE. Victor Hawkinson, Randolph, Kans., director, Blue Valley Association.

STATEMENT OF VICTOR HAWKINSON, DIRECTOR, BLUE VALLEY ASSOCIATION

Mr. HAWKINSON. Gentlemen, in recent days Kansas has been awakening to a new era of the watershed treatment which has been the main part of the program here today. I endorse every word that has been said about soil conservation. I own a farm of 160 acres, terraced, but when it comes to retention dams, I think they are the backbone of the whole flood control, and with the retention dams, if the engineers in charge use proper judgment and figures, there is no need of that big dam down at the outlet. I think we have been handicapped by the big power machine that is led by General Pick. When this disastrous flood came through here it was televised and taken to Washington. You probably saw the television pictures, indicating flood control was needed. Now, did they have any pictures of the Washita district, Little Sioux, which dams were designed and working under heavy rainfall to produce flood prevention? No. They didn't show those pictures. That is all.

Mr. HOPE. Rev. Guy Hartman.

STATEMENT OF REV. GUY HARTMAN, BROWN COUNTY SOIL CONSERVATION DISTRICT

Rev. HARTMAN. I represent Brown County which is made up of citizens of that county. I was honored in being elected an honorary member of this committee. We are ready to go in Brown County, at the north end of the Delaware, endorsing the proposition which was so ably presented before. So in order to save time we shall file with you our report. Here is what our figures show. We have a drainage in Brown County for which the soil-conservation committee is responsible, of 12,770 acres, comprising 140 farm units. There are complete now 88 farm plans. We have 25 applications and there are only 32 noncooperators, which means we have already 85 percent of cooperators. I don't think there has been any higher figure shown than that. We are ready to go. Our engineer has figures on what we have and what we additionally need to complete any program, terracing, watersheds, water diversion, crop control, rotating, contour farming, what we would need there, $280,553, or taking a section at a time, $11,584. This morning you asked someone how much it would be per acre. Ours would be less than $18 per acre to put all that under control. In the Fall River figure they gave this morning, they had $20,000 per section. Compare those figures.

There was one phrase that was given this morning, one word which I haven't heard mentioned before or again today and that was in the plan that Mr. Young gave, that there should be some "zoning." I

presume he meant down the river or wherever we may have the zoning. Your feeling is that you can say, "You have to move out in order to give in." And by the same authority you may go down to Kansas City or any place else and say, "Here is a zone which you can't move into," that it will prevent the flood that would come there. You cannot control it at all. Therefore, let us move back, give the river its place. You say, "We are limited in what we can do." You Congressmen are fathers of our country and you can rise out of being politicians up to being statesmen. We are at the turning point in American life. If some of the children say, "We have to have such and such money," then the fathers say, "There is nothing more important," and we believe if you fathers will say to us, the proper place for control is up here on the ridge, and start down and then build what dams are necessary, below—we thank you very much for your kind attention. It has been educational to us as well as to you and we are firmly convinced it can be done. And may I say from the standpoint of a minister, as has already been said, we believe it to be a moral question. We believe America is coming to a new sense of responsibility. Give us the money and we will show you that it can be done.

(The prepared statement of Rev. Guy V. Hartman follows:)

STATEMENT OF REV. GUY V. HARTMAN, BROWN COUNTY SOIL CONSERVATION DISTRICT, KANSAS

The board of supervisors of the Brown County soil-conservation district, representing the people of Brown County, Kans., are definitely interested in controlling floods through developing a sound, coordinated conservation treatment of every watershed.

We are positive that our first line of action to control floodwaters must begin where the rain first strikes the ground. Consequently, our first step in upstream flood control is to put the soil in condition for the greatest amount of water intake.

Second, any water that our soil will not consume will be slowed up through terraces, waterways, grass strips, and pasture to the point that it carries the least amount of silt.

Third, the excess water that does flow off the field in the watershed can be slowed down with retention-type reservoirs.

We would like to list the following advantages for upstream control:

1. It controls the floods all the way down the valley. The benefits start at the top of the watershed.
2. It stores water on cheaper land or at worst on pasture land which still produces as well as it did before, after the floodwater recedes.
3. It doesn't cover the valuable farm land which is the bread basket of a growing nation.
4. The structures are assets to the farmer and he contributes to the cost by giving an easement on the land without charge.
5. The cost of such projects is actually less per acre of runoff controlled.
6. The recreational facilities are spread out in many communities; thus become more valuable to the people.
7. Water stored in the upstream areas recharge the ground water which is becoming critical in many areas because of continuous increased consumption.
8. Eliminate flood damage to highways and bridges which has been serious in recent floods.
9. Upstream flood control is essential to protect downstream flood-control works.

We are convinced that upstream detention dams coupled with erosion control and proper land use will solve the problem of flood control and it is high time that it be given an adequate trial on a sizable scale like the Delaware watershed with its 1,100 sections of flood-contributing erosive land and the Walnut Creek (Brown County) watershed.

LITTE DELAWARE WATERSHED, BROWN COUNTY, KANS.

The Little Delaware River watershed originates in Brown County and outlets into the Delaware River south of Muscotah, Atchison County, Kans.

The drainage area in Brown County contains approximately 20,770 acres or 18 sections of land. Of the 145 farm units located in this area, 30 to 35 are subject to damage from flooding while the remainder are in a position to contribute or detract from flood hazard. The drainage basin contains 64 percent cultivated land; 35 percent pasture, 1 percent timber, idle areas, roads and municipalities.

To date, 88 farmers in the area have developed complete plans for water and soil conservation and another 25 farmers have petitioned the Brown County soil-conservation district for assistance. These farms cover about 85 percent of the watershed. The attitude of the cooperating farmers is very progressive and thorough. They represent a fair cross section of the leaders, followers and average farmers in the basin. The remainder of the residents are familiar with the principles involved regarding conservation and flood control and are of a temperament which would permit close cooperation if a concentrated effort were made. Ownership of land is approximately one-third owner-operated; two-thirds tenant-operated; 12 percent nonresident owners.

Little Delaware Watershed, Brown County, Kans.

Drainage area	acres	20,770
Farm units		145
Farm plans		88
Applications		25
Noncooperators		32
Percent cooperators in area		85

Established and recommended practice needs for conservation and flood control

Practice	Unit	Established	Estimated additional requirements	Estimated additional cost
Detention dams	Each	0	15	$55,000
Erosion control structures	do	45	50	35,000
Farm ponds	do	15	10	5,000
Terraces	Mile	185	293	64,600
Outlets and waterways	Acre	314	350	35,000
Drainage ditches	Mile	3	6	3,600
Diversions	do	7	12	3,600
Pasture improvement	Acre	4,013	3,013	6,753
Crop rotation	do	5,740	7,192	
Contour farming	do	5,200	7,732	
Total				208,553

NOTE.—Estimated cost per 650 acres (section) for complete conservation practices and flood control, $11,586—$20,000 per section in Fall River watershed.

BROWN COUNTY SOIL CONSERVATION DISTRICT,
Hiawatha, Kans., August 14, 1941.

Hon. FRANK CARLSON,
United States Senate.

DEAR SENATOR CARLSON: As is every good citizen, the board of supervisors of the Brown County soil conservation district is vitally interested in flood-control problems. It is felt that our Congressmen should very definitely give consideration to the cost of the flood-control program, as well as to its effectiveness, as the tax burden is already tremendous. We would like sincere consideration given to the upstream flood-control plan, as outlined below.

The recent flood disasters leave no doubt that positive action should be taken to control the floodwaters—but it is equally important for every one concerned that the proper methods of control be implemented.

Upstream flood control has been put into operation, and its effectiveness tested, on various streams and rivers in the Midwest. In recent articles, Mr. Elmer T. Peterson, of the Daily Oklahoman, reports that the Sandstone Creek, draining

a 65,000-acre watershed area, and having been given the full conservation treatment, which included 24 detention reservoirs and several gully plugs, as well as most of the land being terraced, contour-farmed, steep or eroded areas seeded down, pastures properly stocked and so on, very satisfactorily avoided a flood after a rain varying from 3 to 4½ inches within the watershed. Previously, Sandstone Creek was out on a rampage on the slightest pretext. Barnitz Creek, near Clinton, Okal., received 13 inches of rain within 24 hours. This 14,000-acre area was served by two detention dams and two gully plugs of farm pond size in addition to the usual surface treatment. Neighboring creeks with the same amount of rainfall went on terrific flooding sprees, yet the Barntiz Creek stayed nicely within its banks. West Owl Creek was hit by a 13.58-inch downpour in 36 hours, of which 12 inches fell in 5½ hours. Out of this cloudburst, the detention reservoirs impounded 4½ inches and surface treatment of terracing, regrassing, etc., absorbed not less than 8½ inches on the 36-hour basis. The remainder was equalized over the 36-hour period, being held back so that it did not spill over the banks of West Owl Creek until it had flowed 1 mile below the last detention reservoir and picked up water from untreated watersheds. Similar results of controlling floods could be related concerning Cloud, Mill, and other creeks that have been given the soil-conservation prescription.

In the relatively few instances where it has been tried, upstream flood control has been adequate to do the job.

The Army engineers, on the other side of the picture, admit that the big dams would normally be silted full in 50 years—that means that at the end of 50 years there is no flood protection from the dams, and after 25 years, cities and farms below the dam could expect only half the necessary protection. Add this information to the fact that the Army engineers' dams have actually contributed to floods above the reservoir area by the deltation they cause in the stream beds, which in effect, makes another dam upstream as much as a hundred miles, with the resultant flooding above this delta area. Miami, Okla., is a specific example of this type of flood caused by a big reservoir downstream. Deltation caused by the Grand River Dam in Oklahoma caused water to back up into Miami and was a material cause for the estimated $5,000,000 damage to that city this spring. Farmers on both sides of the Mississippi River above Alton Dam held a mass meeting July 30 at O'Fallon, Mo., attended by 150 representatives, in which they bitterly complained that the dam downstream had caused 15 floods in 9 years.

The record of the Bonneville Dam on the Columbia is not impressive. After the building of this dam, a flood came over that structure and killed 40 persons and caused a loss of $200,000,000. In recent floods, in Salina, it was reported in the Kansas City Star that the Army engineers were releasing from Kanapolis Dam 5,500 cubic feet of water per second to protect Kanapolis spillway, while the carrying capacity of the Smoky Hill River was only 4,600 cubic feet per second; in other words, they were releasing 900 cubic feet a second more than the river will carry.

At a time when the United States needs all its money and production capacity for national defense, the Army engineers are asking for billions of dollars during the next few years to build dams, the results of which will be merely some flood protection for cities below the dam for, at most, 50 years. In addition, they will need to inundate hundreds of thousands of acres of land with their reservoirs—Battle Creek Dam alone will cover an estimated 55,000 acres of good bottomland, permanently take out the Nation's food production almost a quarter of a million bushels of corn every year. Multiply that by all the dams planned for Kansas, Nebraska, and Colorado and then multiply again by 50 years and you can see there is a lot of good wheat and corn we are not going to get in the future.

Why take out of production this land which is vitally important to the farmers as well as to the cities along the Kaw Valley? All this land will no longer be taxable as the Government will own it, and the population will have to absorb this loss, as well as help pay for the expensive dams. In addition, the big reservoirs will not save a nickel's worth of soil and the very soil the dams do not save will cause the dams to be worthless in 50 years or so.

The upstream flood control plan has the advantages of increasing the water insoak and productivity of the land, keeping the soil where it can continue to grow crops, recreational lakes are located over a large part of the State (protected from siltation by soil conservation practices), saving rich bottomlands to help produce the steaks we all enjoy, and a huge saving in the cost of construction. But most important—it works and will continue to work.

In the national interest, appropriations for upstream flood control are urged—one tenth of the money asked for the completion of any one of the big dams would

make possible the control of a watershed such as the Delaware watershed. The upstream flood control could be immeasurably speeded up by such an appropriation and the money thus put to a useful purpose.

This letter was unanimously approved by the board of supervisors at a meeting held August 13, 1951, at Hiawatha, Kans.

Very truly yours,

NATHAN K. BABCOCK,
Chairman, Board of Supervisors.

BROWN COUNTY SOIL CONSERVATION DISTRICT,
Hiawatha, Kans., July 12, 1951.

Hon. FRANK CARLSON,
United States Senate, Washington 25, D. C.

DEAR SENATOR CARLSON: This board of supervisors of the Brown County, Kans., soil conservation district, representing the farmers of the county, realize that you are to be deluged with urgent appeals from various people and organizations for Federal appropriations for flood control. Also that most appeals are for downstream control. We are definitely interested in and have studied the possibility of upstream flood control. We realize that our information is not as detailed or complete as we would like it to be. However, we would like to list the following advantages for upstream control.

1. It controls the floods all the way down the valley. The benefits start at the top of the watershed.
2. It stores water on cheaper land or at worst on pasture land which still produces as well as it did before after the flood water recedes.
3. It doesn't cover the valuable farm land which is the bread basket of a growing Nation.
4. The structures are assets to the farmer and he contributes to the cost by giving an easement on the land without charge.
5. The cost of such projects is actually less per acre of run-off controlled.
6. The recreational facilities are spread out in many communities; thus become more valuable to the people.
7. Water stored in the upstream areas recharge the ground water which is becoming critical in many areas because of continuous increased consumption.
8. Eliminate flood damage to highways and bridges which has been serious in recent floods.

Proponents of the large dams claim that this type of flood control is not effective. However, it has worked, and worked well, in the two instances with which we are familiar, namely the Shippel ditch, Saline County, Kans., and Owl Creek in McClain County, Okla. The latter withstood a 15-inch rain without an overflow below the retention dams last year on land which was regularly flooded before. These are positive demonstrations of the effectiveness of upstream flood control. We are sure that they merit larger scale trials before expenditures of public money on downstream structures such as dams and levees.

Cost figures available prove that upstream flood control can be accomplished at less cost than downstream dams and levees. For example:

The Shippel ditch project cost $4 per acre. In this project the water storage actually cost $65.23 per acre-foot of water stored. This storage was emptied slowly between rains.

On the Oklahoma project, actual storage costs per acre-foot for six detention dams (1948–49 construction) ranged from $22.29 to $52 which amounted to about $18 per acre of land above the dams on the average.

The Army engineers several years ago estimated a cost of over $18 per acre cost of the area above the Perry (Kans.) Dam and $75 per acre cost for the land above the Walnut Creek (Brown County, Kans.) Dam. Every one familiar with construction costs realizes that they would be about double the estimate if they were constructed now.

We would strongly recommend that you read an article by Elmer T. Peterson (on staff Daily Oklahoman) in Friends of the Land summer issue, 1950.

In conclusion, we believe that upstream detention dams coupled with erosion control and proper land use will solve the problem and it is high time that it be given an adequate trial on a sizable scale like the Delaware watershed with its 1,100 sections of flood-contributing erosive land and the Walnut Creek (Brown County) watershed.

It can be done for less money than the cost of construction of a big dam at the lower end of either valley and will keep floods off the people down stream while solving the erosion and flood problems of the people upstream at no added cost.

This letter was approved at the last regular meeting of the Brown County Board of Supervisors held July 9, 1951.

We urge you to give serious consideration to upstream flood control before acceding to demands for expenditure of money on downstream flood control, which has proven ineffective and terribly expensive.

Yours very truly,

NATHAN K. BABCOCK,
Chairman, Board of Supervisors.

STOP WATER WHERE IT FALLS

(Excerpts from address to Kansas State Association of Soil Conservation District Supervisors, Wichita, Kans., November 28, 1950, by Elmer T. Peterson, Oklahoma City, Okla.)

* * * It is a great pleasure and privilege to visit Wichita, where I spent 10 years and was treated most kindly. I still have a farm in western Kansas where we are using every practicable soil conservation measure. * * * I am a cooperator in an Oklahoma soil conservation district program and my most prized possession on the wall of my office is a plaque awarded to me 2 years ago by the Oklahoma Association of Soil Conservation Supervisors. * * *

Tonight * * * I am going to produce facts and figures which are such a clincher that I doubt that any one will dispute the proposition that the best way to stop floods in the Great Plains area is to use watershed treatment. * * *

No single person or group was responsible for the establishment of the Washita Valley agricultural flood-control project, but it gradually came into being about 10 years ago because of the strenuous demand that the United States Department of Agriculture through the United States Soil Conservation Service, do something to demonstrate the principle of stopping water where it falls, which would not only save the soil but prevent floods. * * *

In July 1948, the project, involving 5,000 acres of creek watershed, was finished * * *. On the fololwing May it received its baptism, consisting of a 4.6 inch cloudburst falling within a few hours. Other creeks in the neighborhood got the same kind of a deluge and they promptly overflowed, sending destructive floods into the Washita, where the flood was very bad, doing great damage in the Anadarko area.

* * * Not a bucket of water flowed out of the treated part of the creek.

The most spectacular exhibit of the superiority of the agricultural flood control system, however, was furnished last May by the treated part of the West Owl Creek watershed, south of Purcell. It was hit by one of the heaviest cloudbursts ever seen in the Middle West, which was 15.58 inches of rain in 36 hours, of which 12 inches fell in 5½ hours. This produced what is called a 100-year flood—that is, a flood which, by the law of averages, can be expected not oftener than once in 100 years.

Please mark carefully what happened. Out of the 15.58 inches of cloudburst, the dentention reservoirs, which are glorified farm ponds, impounded 4½ inches and the surface treatment of terracing, regrassing, etc., absorbed not less than 7½ inches on the 5½ hour basis or 8½ inches on the 36 hour basis. The remainder was equalized over the 36-hour period, being held back by the outlet pipes so that it did not spill over the banks of West Owl Creek until it had flowed one mile below the last detention reservoir. * * * In other words, if the entire Washita Valley had received and handed a similar 100-year cloudburst, and had been given the same surface treatment, there would have been no flood in the Washita River.

These are official Government figures, based on the Weather Bureau statistics and indisputable engineering data.

Further breakdown of the facts and figures show that the little dams alone took care of 4½ inches of runoff, and that is what is called a 25-year flood.

Now for comparison, let's take two outstanding examples of the Army engineers' or big-dam method of flood control—Fort Gibson and Denison Dams.

It almost seemed as though Mother Nature had purposely set up the comparison with the Fort Gibson Dam, for the heaviest rainfall came in the West Owl Creek region and there was another spot of heavy rainfall on the watershed above Fort Gibson, in eastern Oklahoma. The difference is that the rainfall in the same period on the Fort Gibson watershed was 9.79 inches, or about two-thirds of what fell at West Owl Creek.

The Fort Gibson Dam lies about 50 miles downstream from the big Grand River Dam (or Neosho River, as it is known in Kansas). The Army engineers were quoted on May 12 as saying that the river overflowed the Grand River Dam and also the big Fort Gibson Dam at the rate of 140,000 cubic feet a second, and this torrent went on into the Arkansas River and contributed materially to a very bad flood in the bottoms * * *. This is nothing new, for the same thing happened in 1943 when the Grand River contributed half of the Arkansas River floodwater which did $127,000,000 worth of damage and drowned 19 persons. * * *

Now look at the Denison Dam, which forms Lake Texoma. It is built across the Red River, just below where the Washita flows into it.

Its cost * * * was $61,595,000. It contains 18,290,000 cubic yards, including concrete steel, making the total cost per cubic yard $3.30. The flood pool of this big reservoir is 2,690,000 acre feet and the total watershed is 38,291 square miles. Using these factors we find that a total net runoff of 1.31 inches would fill up the flood pool from its lowest level, and start running over the dam with the same volume as though there were no dam there.

Taking the Mill Creek watershed of the Washita Valley agriculture flood control project as typical, we find that the average cost of building the small detention dam is 27 cents per cubic yard, or less than one-tenth the cost of the Denison Dam.

* * * The small detention dams of the agricultural flood-control project can be built for less than one-tenth the cost of the big dams, and that they will impound anywhere from three to six times as much water as Denison Dam, in proportion to area of runoff. * * * In other words, the little dams beat the big dams at their own game, which is entirely a matter of reservoir impoundment.

Can you think of any farmer or businessmen who were given actual proof that a different method of operation would reduce his costs to less than one-tenth, and do the same job from three to six times more efficiently than the way he was doing it and still refuse to consider the cheaper and infinitely more efficient way? * * *

The onl yargument I ever heard of from the big-dam promoters, on this point runs something like this: "Oh, well, that may be all right for a creek watershed, but you have no engineering proof that it will work on a big river watershed."

My answer is this: Any one who knows simple arithmetic knows that the whole is equal to the sum of all its parts. If flood conditions are prevented on all the tributaries of the river, where on earth could the water come from to produce a flood in the river? And now we have the indisputable engineering data, to prove that the little dams are far more efficient than the big ones. * * *

I have shown that in a single item of runoff impoundment, the little dam is far superior to the big one, but that is only one of the great advantages of the soil conservation method of flood control. There are at least seven other points of superiority, as follows:

1. *Watershed insoak.*—The agricultural program uses terraces, regrassing, * * * and other types of land use that produce a great sponge to soak up water where it falls, exactly as Mother Nature did before the plow came, and sometimes even better. This sponge action worked so beautifully in the West Owl Creek watershed last May that this phase treatment took up at least 8½ inches of rainfall in 36 hours or almost twice as much as was impounded from runoff by the little dams. The Red Plains demonstration farm near Guthrie, Okla., has several sloping plots, all of the same soil and area. Once when a fall of about 2 inches fell in one hour, a bare plot shed 98 percent of its water, while the same kind of plot with sweetclover cover shed only 2 percent! This explains why plowed or bare ground promotes floods, while good farming stops floods. * * *

2. *Restoration of high-water table.*—We all know that the general water table has been falling at an alarming rate, all over the country. * * * And here is another point which shows that the big-dam movement is obsolete, for obviously

the big dams can contribute little or nothing to the widespread watershed insoak which is absolutely essential for the restoration of ground-water supplies. Nature's own primitive way was to retard water, first using it to nourish vegetable and tree life, then cause it to seep down through natural filter beds, forming clear springs and underground veins. These, in turn, fed small brooks and creeks, and kept clear water running steadily in our rivers. * * *

The restoration of clear, filtered water is also essential to irrigation, so here is the next point.

3. *Irrigation by clear water.*—I should say, in regard to the Washita project, that farmers who have the detention ponds are free to use the water for irrigation, and where proper conservation methods are used, the water is clear.

4. *Prevention of situation.*—The Washita project method stops siltation while the big-dam method produces siltation, not only in the reservoir but far above the reservoir in the tributary river channels. During the first few years the fishing may be good, as in Lake Texoma, above the Denison Dam. But the siltation from the Washita River is proceeding so fast that the Federal fish hatchery expert at Tishomingo says that fishing is doomed. Fishing is no good at Tishomingo because silt chokes out the vegetable life upon which all aquatic life ultimately depends, and it ruins the spawning beds. * * *

Lake siltation isn't the worst, either. * * * I talked with the leading citizens of Pauls Valley last May. They are 140 river miles upstream from Denison Dam, but they already see great increase in siltation of bottom lands, and in May that city had its worst flood in history, doing more than $5,000,000 worth of damage. Right near there I saw fields that used to produce big alfalfa crops which had been choked out by sand and now have nothing but Johnson grass, other weeds, and a general mess.

5. *Saving rich bottom lands.*—We are losing our best land at the rate of 500,000 acres a year because of erosion, and we can't afford to lose any more. Yet the big-dam program is rapidly taking our best land out of cultivation by the hundreds of thousands of acres, in fact millions. * * *

At this point I would like to make a special plea that you and everybody you can influence get behind the plucky little band of farmers and small-town businessmen in the Blue Valley, above Manhattan, whose community in the Randolph area is threatened with extinction. The Pick-Sloan program proposes the huge Tuttle Creek Dam, to inundate 55,000 acres of the best bottom land in the region. I was there last spring and have been in close touch with these people. * * * The last figures I have received show that the total minimum annual recurring loss in farm products alone would be more than $6,000,000. * * *

The Washita Valley project takes no homes and no good land from the people. It utilizes wasteland for the little detention reservoirs, and then it heals the scars of erosion and disintegration on the land, brings that land back to smiling fruitfulness and adds richly to the crops and to the cattle on a thousand hills.

6. *Flood control is chiefly needed upstream.*—The engineers of the United States Department of Agriculture have conducted research which shows that from 80 to 85 percent of all agricultural flood damage is done above, and not below the proposed big-dam sites. I have studied this closely and have seen remarkable first-hand proof. For instances, there was the farmer in the West Owl Creek Valley, whose bottom-land fields had been wiped out with every previous flood. This time, after the unprecedented cloudburst of 15.58 inches, he was happily plowing corn right in the path of where the floods used to sweep. Then there is the Colvert ranch, in the Mill Creek area. Last year this ranch lost 1,000 bales of alfalfa in a flood. This year, after the big cloudburst in that general area, I telephoned the ranch and was told that about 8 inches had fallen there, but there was no damage because of the conservation work done up the valley. Such instances can be multiplied indefinitely. Both of these farms were above the $61,000,000 Denison Dam, in the Washita Valley. So the point is plain.

7. *Saving the soil.*—In some respects this is the most important of all the points, for the loss of soil means the loss of our whole economic understructure. If the soil goes, we all go, whether we live on the farm or on Park Avenue, New York, or on Douglas Avenue, Wichita. Of course the big dam has nothing to do with this. The Washita program saves the soil along with the water, and keeps them in the right relationship with each other. The only way to keep the water where it belongs is to keep the soil where it belongs and the only way to keep the soil where it belongs it to keep the water where it belongs—stop the water where it falls.

* * * You know of the huge Bonneville Dam on the Columbia. After the building of this so-called multiple-purpose dam, a flood came over that structure

and killed 40 persons and caused a loss of $200,000,000. That was below the dam, which was suppposed to have been protected from floods.

* * * We must tame the wild waters before they get wild—educate the streams while they are very young. Otherwise, when they get big, they will turn upon us and destroy our wealth and lives. Dr. H. H. Bennett says that the plow era brought in 200,000,000 new water channels, which hurry the water off the land and into the streams and finally into the ocean. These channels are gullies, which cause the water to rush downhill. Why should there be any question as to the wisdom of conservation when the lessons are so plain.

If we are to save our land for posterity, if we are to have a great healthy, prosperous Nation, we must restore the ancient and timeless rule of nature. We must stop water where it falls.

This material is felt to be pertinent to the flood-control situation at the present time and is furnished you with the compliments of the board of supervisors of the Brown County soil-conservation district.

Mr. HOPE. Edith Monfort.

STATEMENT OF EDITH MONFORT, SECRETARY, KANSAS SOIL CONSERVATION AND FLOOD CONTROL ASSOCIATION

Miss MONFORT. Much of what I might say has already been said; and, since I have a written statement to file with you, I think I should let that take care of most of my argument. I would like to make one point. I don't think it will be explained how Congress has blundered to place the jurisdiction over our best farming land in the hands of an agency that is trained for the construction of mammoth concrete structures rather than in the care and preservation of our most precious resource, our soil. I cannot conceive of any agency, trained in agricultural interests and having that entrusted in its care, that would destroy vast acres of our most fertile farm land in the interest of so-called public good without having ascertained and charged against the project the real value of that land. In Osage County there are two dams that have been proposed; and, together with Garnett, that makes three. The net annual benefit of those three dams is $55,000. An independent survey made by a member of the staff of the Kansas State College at local requests shows that the annual recurring agricultural production loss of two reservoirs in Osage County is over a million dollars.

I myself am not deceived by the public pretenses of cooperation and mutual endorsement at which your agencies play. The Corps of Engineers does not endorse the agricultural flood-control program. It does not even recognize its existence. On the other hand, no agricultural agency could possibly endorse the program that destroys the very thing that should be their trust. I, too, am sorry that our honored guest from the North could not have stayed. I would like to have read to him a letter which I have here from Harry Chambers, who is the Oklahoma State conservationist. Mr. Chambers here described a watershed project, a part of or sort of program that the Department of Agriculture would prepare for us. This is on West Barnett Creek, that area, 5,000 acres. On May 16 of this year a 13-inch rainfall fell on that area in 7 hours. All but the first inch fell in the last 4 hours. The land-treatment program, estimated to be 90 percent applied, plus the storage in three drought inlets and two retention reservoirs, stored all of the water. This is the sort of program the Corps of Engineers tell us might save soil but is of no use in controlling floods. It controlled a 13-inch rain.

It is because of this confusion and a certain withholding of informamation and a situation of suppressed rivalry among the agencies that makes it necessary for the people to step and try to provide the unity and soundenss that seems to be lacking. And that, gentlemen, is what is back of the development of watershed organizations in Kansas which are taking such strides today. We, the people, hope to be able to work among ourselves and with the agencies and produce a program that will have the unity that we need. This does not mean that farmers are going to try and tell hydraulic engineers how to design a dam.

At a recent watershed meeting in Topeka the State water engineer was an invited guest in an advisory capacity to the group. He was present, and two persons giving legal counsel. As we envision this thing, various experts over our State, Kansas all of them, will provide their expert technical assistance where needed, so that when this thing is produced we will have a program that will be by Kansans and for Kansans. And now it is our request that the Congress will authorize watershed programs of the Department of Agriculture so that we will have them to work with in order to give the proper balance to the program. Up until now our hands are definitely tied to that part of the program. I thank you, gentlemen.

(The prepared statement of Edith Monfort follows:)

Congressman W. R. POAGE,
Chairman, Flood Control Subcommittee,
House Committee on Agriculture, Washington, D. C.

CONGRESSMAN POAGE: I wish to discuss with you the matter of a sound standard for judging the feasibility of any flood-control project. As you know, the Hoover Commission severely criticized the existing national flood-control program as one that gave undue emphasis to the engineering aspects of the situation without proper consideration for the agricultural, economic, and social aspects. I believe you will understand my viewpoint when I say that the agricultural, economic, and social results of a flood-control program are the true measure of its worth and that the engineering devices are but the means to the end.

Floods, being a natural phenomenon, do not lend themselves readily to control. But mankind can by judicious management and carefully designed devices reduce their damages. The reduction of damages, therefore, rather than the restraining of waters must furnish the true criterion of a flood-control work.

I can conceive of a system of colossal engineering works down our river valleys such that floodwaters are contained therein and systematically released. But, unless the operation of such actually increases the Nation's food supply, contributes to business prosperity, and protects the homes and farms and businesses, the lives and interests of the people from the ravages of floodwaters, and does so more efficiently than any other method, then it is not desirable.

AGRICULTURE

I think I shall never understand how the Congress so blundered as to place jurisdiction over our best valley farming land in the hands of an agency trained to build structures of concrete but not in the care and preservation of our most valuable asset, our soil. I cannot conceive of any agricultural interest or agency deliberately planning to destroy the productivity of vast acres of the Nation's most fertile farming land in the name of public good as the engineering agencies of our Federal Government do in river-reservoir planning. Neither can I accept the practice of ignoring the annual recurring loss in farm products of a reservoir area as a legitimate cost a legitimate cost chargeable against the project. While not actual cash expense, it certainly represents a loss to the Nation.

To give some idea what this matter of agricultural productivity in a reservoir area can mean, let me call attention to proposed river reservoirs in the Army engineers' plans in which a net annual benefit of $55,000 is shown for three reservoirs: Melvern, Pomona, and Garnett. An independent survey of annual agricultural production in the reservoir areas of two, Melvern and Po-

mona, executed by a member of the staff at Kansas State College at the request of local citizens, showed an annual recurring productivity of $1,205,369, much or all of which would ultimately be lost if the reservoirs were built. This loss exceeds the benefits many times. This proves that the effect of the operation of any flood-control program on agricultural production is of prime consideration.

ECONOMICS

As a business, the production of foodstuffs, their processing and marketing, together with production of many raw materials for manufacturing, contrive to make and keep agriculture the chief industry in Kansas. Whatever is best for Kansas agriculture contributes to general business prosperity.

The Kansas City stockyards suffered severely in the floods this year. But, if it were not for the agricultural interest out over the country, there would be no reason for existence of the Kansas City stockyards. This is but one pungent example of the fundamental role agriculture pays in the basic economic structure. Whatever flood-control program is developed for industrial development dare not lose sight of agriculture.

"Destroy our cities but leave our farms, and our cities will spring up again overnight. Destroy our farms, and grass will grow in the streets of every city and village and hamlet in the country."

SOCIAL INTERESTS

Protection of homes, farmsteads, businesses, and a people's way of life are all intangibles difficult of evaluation and certainly not reducible to dollars-and-cents assessments.

The welfare of minorities is a declared concern of our Government, and certainly such groups as dwellers in the downstream flood plains and the dwellers in proposed reservoir areas are subject to such consideration alike. Any flood-control program that safeguards the welfare of all such groups alike, rather than playing one class off against another, is assuredly the superior plan and should be diligently pursued.

Also, the future is in our keep today. I once asked an official what would be the answer when the big dams had filled with silt. The reply I received shocked me. I was told that since they would last a long time, maybe 50 or 100 years, beyond my life span, I should not care. I expect to have children and grandchildren here then. The future matters to me. I care. On another occasion I asked a similar question about ultimate siltation of big dams and was told that when that time arrived the engineers would probably go upstream and build another dam.

If we bequeath to our posterity a series of silt flats along our valleys where fertile fields ought to be, all usefulness of the projects spent, together with the indebtedness for cost of the undertaking, then we shall deserve the calumny we shall receive from the lips of those who come after us. If, on the other hand, we plan carefully now to preserve for future usefulness every precious fertile acre, regardless of its location, together with all possible safeguard for every man's home, farmstead, and business, then we shall not only have served our own best welfare but we shall have passed on to our children's children's children the birthright of abundance that is their rightful heritage as it has been ours.

WATERSHED ENGINEERING

Heretofore flood control has been regarded as being in two parts. Emphasis has been on engineering works, mostly dams coupled with dikes at special points in the flood plains after the floods have became raging torrents. Tossed in as as afterthought came an upland program, where the floods start, with well-accepted land practices and vaguely known engineering devices.

I have a letter from Harry Chambers, Oklahoma State conservationist, describing to me recent experience with one such watershed project. This letter reads in parts as follows:

"There is a story concerning a small tributary of West Barnitz Creek, which runs into the Washita near Clinton, Okla, which may be of interest to you. During the storm of May 16 this creek received on its watershed of approximately 5,000 acres some 13½ inches of rainfall in a 7-hour period. All except the first

inch fell during the last 4 hours, and one farmer stated it was the hardest rain he had even seen in the 22 years he had lived there. The rainfall measurement was unofficial, although it was made in a calibrated gage.

"The land-treatment program (estimated to be 90 percent applied), plus the storage in the three drop inlets and two detention reservoirs, stored all of the floodwater. Neither of the detention reservoirs, which are located in the loweer end of the drainage ara, discharged any flow through the spillway. Floods which damaged fertile bottom-land and fields following rains no more than half the size of the May 16 storm in past years were not experienced in this watershed."

This is the program that Pick-Sloan insists may save soil but is of no value in controlling floods. It controlled a 13-inch rain.

Watershed engineering recognizes the drainage area as a unit in flood-control planning rather than dividing it up among several agencies.

Watershed engineering begins where the floods begin and continues its course with the flow of the waters over the fields and grasslands, into the ravines and gullies, along the creeks, and into the rivers. From topmost pasture to the very doorstep of flood victims it proposes to go all the way. It leaves no gaps.

Watershed engineering asks no community to go unprotected because of its unfortunate location upstream from points of isolated control; it asks no community to sacrifice its life that another might live; it asks no community to depend for its protection upon points of control miles and miles upstream, its effectiveness reduced to the vanishing point with distance. It permits no breaks in the program between jurisdictions of rival agencies competing for public favors and support.

INTERAGENCY DISPUTES

Here let me say that I am not deceived by the facade of cooperation, the public pretense of mutual endorsement, at which the agencies play. The crops does not endorse the flood-control program of the Department of Agriculture; it refuses to concede the potentialities of such a program; in fact, it does not even recognize the existence of such a program. The Department of Agriculture, on the other hand cannot conscientiously endorse the destruction of vast acres of fertile farm land for a reservoir system. It is against the very principles of the Department, for when the Department of Agriculture builds a reservoir it chooses wasteland or grassland that withstands the inundations.

PEOPLE'S PARTICIPATION

It is not in accord with the robust spirit of Kansas to yield the solutions of its problems either to an authority or to separate agencies. But the confusion resulting from interagency contentions makes it imperative that the people themselves enter flood-control planning.

This does not mean that farmers are going to tell hydraulic engineers how to design a dam. Recently at a watershed meeting the State's water engineer was the invited guest acting in an advisory capacity to the group. Also present were two attorneys giving legal counsel. As the movement progresses experts in all lines may be expected to contribute their appropriate services, Kansas citizens all of them. Government agencies will be asked to contribute their data and their special abilities, may be asked to make some studies and surveys not now a part of flood-control knowledge. But through it all the new people's movement will insist upon unity of purpose and design.

Delays in flood-control work because of this movement will not be felt since, long before any comprehensive flood-control program can reach an effective reality, this plan will be ready to go into construction.

As part of our working basis we ask that Congress place at our disposal the cooperation of the various Federal agencies so that their work, which Kansas tax dollars help to support, may be used for the best interests of the State. Specifically we ask that Congress authorize the watershed program of the Department of Agriculture so that that phase of flood-control work may be given the consideration hitherto denied it.

Mr. HOPE. W. C. Niehart, of Lyndon, Kans.

STATEMENT OF W. C. NIEHART, LYNDON, KANS.

Mr. NIEHART. Mr. Chairman, members of the committee, I have been thinking that practically everything I might have wanted to say has been said very ably. There are two or three things I want to point out. There have been some statements made today that I believe were based on false premises. During the flood I read, I believe, where General Pick stated that the Tuttle Creek Dam would have stopped the water. If I owned property in Manhattan and Topeka or Lawrence, or Kansas City or Ottawa, the first thing I would want to know is if the Pick-Sloan dams in Kansas or the hundred different proposed dams in Kansas would have affected that flood crest and how much. I think that the geological figures are probably available now or soon will be that will show within reason what effect the Pick-Sloan Dam at Kaw River and Marais Des Cygnes and Neosho would have upon the flood crest. I think a great number of people living down below that have suffered these heavy losses should make it their business to find that out. When we have 14 to 15 inches of rain over a wide territory in 3 days and in 3 nights, I am not sure but what you have got to do is give the river back something of what you have taken away, and that is what I think is one false thing we have had brought up several times today.

Another which seems so simple to me and seems to be against all engineering reasoning or principles is that if you have 5 gallons of water to carry or to hold, you have to have one 5-gallon bucket to hold it in, you can't split it up in numerous small containers. I have heard that at different meetings coming from high engineers and other authorities that in order to stop floods of water we have to have huge reservoirs or 5-gallon buckets. There is no other way you can hold that water. You have got to have it that way, you can't split it up in gallon containers. I think the question was raised by you, Mr. Hope, would this program stop all floods? I think that is totally unanswerable. The amount of rainfall, the time it falls, and all that will enter into any flood situation or any storm we have, but I don't think there is any doubt in anybody's mind that you can hold more water in a number of small reservoirs in the hills than you can in the now-proposed huge reservoirs. So they will have to propose more reservoirs than there have been proposed.

Mr. HOPE. Sorry, your 3 minutes are up. George Newell, Rockville, Mo.

Mr. NEWELL. I want the distinction of taking up the least time of anybody that has appeared before you today.

Mr. HOPE. We won't discourage you.

STATEMENT OF GEORGE NEWELL, ROCKVILLE, MO.

Mr. NEWELL. I was at a meeting of our Delaware Watershed Association in Valley Falls the night before last, and you gentlemen have asked here, and I think everyone has presented the same type of program, and you gentlemen have asked what percentage of farm cooperation could be expected from this kind of program. Our meeting last night consisted of quite a crowd and we had 24 persons express themselves on that very question, including people from Hiawatha, on the proposed dam, and we found we could reasonably ex-

pect at least 75 percent of farmer cooperation in this kind of a program. I have got a full report of our meeting and I will hand it in and not take any more of your time.

(The report of meeting referred to above, follows:)

The Delaware River Watershed Association met in Valley Falls, Kans., October 29, 1951.

The meeting was called to order to Mr. Claude Brey, president.

Mr. Ray Wegner, president of the State watershed association, advised the meeting that the State association was now a chartered organization and was in a position to help the smaller associations that dealt with the individual river watershed associations.

Every matter of individual farm cooperation was taken up by the chairman.

Every area of the Delaware River watershed was represented by one or more representatives.

It was definitely brought out that everyone was in favor of flood control, if this control started in the field, in the form of terraces, farm ponds, and small retention dams, and continued downstream with small retention dams on tributaries.

It is believed that a watershed program of this nature will so alter the flood situation that the construction of large dams may not be necessary.

In this manner topsoil would be saved, erosion would be reduced to a minimum and we would have flood control of the highest type.

If the above method is carried out it is quite certain that not less than 75 percent of farm cooperation can be expected.

E. A. ROBERTSON,
Acting Secretary.

Mr. HOPE. I will say you have broken the record, Mr. Newell.

STATEMENT OF H. O. CEDARBURG, WHITE ROCK VALLEY SOIL CONSERVATION ASSOCIATION

Mr. CEDARBURG. I represent the White Rock Valley Preservation Association.

We as an association are 100 percent in favor of the agricultural soil conservation program as presented here today.

You have heard from every phase of the program except the small farm community.

As an example: The soil conservation of Jewell County took a sediment test of the water in the White Rock Creek in flood time and it carried over 30 percent silt. Now, if by soil conservation and retention dams we can hold back that silt, look at the percentage less capacity the floodwater will take.

Now, as a farmer in our community I would like to show you what the soil conservation has already done to me. (Pardon me for using my own private plan as an example, but I can quote it better.) I have about 3 miles of terraces and two dams at present. There has been very little run-off and a minimum of erosion from this operation. There are a great number in the community that are doing the same. But we didn't get started till after the Soil Conservation Administration woke us up to the fact that something could be done about this erosion situation.

Now if we do not do something about the situation we are apt to go hungry, as these old clay hills are getting mighty thin. As an example in 1943, when I tenanted the first land, it was washed till all the topsoil was gone. This year we harvested 40 bushels of oats, and have a 4-foot growth of sweet clover at the present time. Is soil conservation worth the cost year in and year out?

I believe that if the city people do not wake up to the fact that the farmer raises the food for their table, and without their support they might go hungry, in the near future now in the sight of Almighty God we do not know where it is going to rain nor when. So where would you build a big dam to do any good in this phase of the program.

Mr. HOPE. Mr. Charles Myers.

STATEMENT OF CHARLES MYERS, BRUNSWICK, MO.

Mr. MYERS. Mr. Chairman, members of the committee, I am speaking here tonight as representing myself as a farmer south of Brunswick, Mo. I think from the discussion I have heard that there are two problems we have before us. One is the upstream flood control and the other the downstream. I believe soil conservation on the upstream and dams for the downstream would be the solution. I say that as a farmer. The land we own is in Smith Township just south of the town of Brunswick. It was originally acquired by my grandfather in 1880 and has been in the family since. The first flood I have any recollection of occurred in 1909. Since that time there have been floods at various intervals. In 1910 there were 10 families living in Smith Township. As I see it, the effective amount of water control is that which is available at it is needed, rather than the total amount controlled in the area. It is only the proportion that is available at the time of the flood that will be effective on the flood control.

(The prepared statement of Charles Myers follows:)

BRUNSWICK, MO., *October 30, 1951.*

GENTLEMEN: I am a farmer in Carroll County, Mo. The land we farm is owned jointly by my son, son-in-law, and myself. The land lies in Smith Township, between the Grand River and the Missouri River just south of the town of Brunswick. It was originally acquired by my grandfather between 1880 and 1900 and has been in the family ever since.

The first flood that I have any recollection occurred in 1909. Since that time there have been floods at various intervals. The flood in 1947 was the highest on record until the flood of 1951. In 1910 there were 20 families living in Smith Township. Before the 1951 flood, there were eight, and now two more houses have been abandoned.

The land in this area is some of the richest in the State. The land in recent years has produced 50 to 60 bushels of wheat per acre and 70 to 90 bushels of corn, all without the application of any fertilizer.

Flood protection is our greatest need.

From our experiences I would say that three steps must be taken to secure flood protection along the Missouri River. First, the channel must be stabilized. Second, levees must be built to hold the river in its channel. Third, reservoirs must be constructed to control the flood height.

Between 1910 and 1930, 1 mile of land to the south of and including part of our property was cut into the river. Between 1930 and the present time, the river has again moved south 1½ miles and stabilizes in this position by the construction of dikes and retards, which were partially paid for by a bond issue on the district in which our land is located. The channel stabilization is absolutely necessary before levees can be built.

In order to control flood heights, reservoirs must be constructed with controlled outfall structures to withhold flow into the stream at critical periods.

Respectfully submitted.

CHARLES A. MYERS.

Mr. HOPE. H. E. Myers.

STATEMENT OF H. E. MYERS, DEPARTMENT OF AGRONOMY, KANSAS STATE COLLEGE

Mr. MYERS. Gentlemen, distinguished friends of agriculture, there are only two points I wish to make this afternoon in this discussion. I wish to express approval for the soil-conservation flood-control program which has been proposed. I wish to encourage also a balance between the various methods of flood control to the end that a more efficient flood-control program will be carried forward.

The flood-control aspect of soil conservation should be given generous support for several reasons:

1. It contributes to a reduction in runoff losses and therefore must have some effect in the reduction of floods.
2. It reduces the silting of main-stem reservoirs.
3. The main-stem reservoir program is generously supported, yet the useful life of these structures is shortened due to unrestricted silting.
4. The total damage from any flood is only partly expressed by damage done after the floodwaters reach the main stem of the drainageway and destroy or damage crops, livestock, industries, homes, etc. Tremendous damages occur along the thousands of miles of creeks before the water reaches the main stem. Furthermore, a large but frequently ignored damage is the eroded soil in all parts of the watershed, which damage expresses itself in destroyed or damaged crops, gullies which make tillage difficult, and a reduced fertility level which will adversely effect our economy for years to come. The blighted homes on eroded soils, poor crops, poor livestock, buildings not repaired, and unkept fences are as unsatisfactory in our economic system as flood-damaged properties on the flood plains.

Past and present experiences have demonstrated the need for research to point the way for improvements in action programs.

The soil-conservation flood-control program is in its infancy. A well-financed research program should produce at least two distinct benefits:

1. The development of improved practices.
2. More economical use of appropriated funds.

Preliminary plans have been made for an expanded research program in the field of soil and water conservation by the Missouri Basin Research Committee, representing both Federal and State research agencies in the 10-State area of the watershed. Certain phases of the proposed research program deal directly with soil-conservation flood-control problems. If an expanded soil-conservation flood-control program is to be started, this research program should be given adequate financial support.

STATEMENT PRESENTED BY KANSAS STATE BOARD OF AGRICULTURE

The Missouri River Basin agricultural program recommended by the Secretary of Agriculture has been carefully reviewed in the office of the Kansas State Board of Agriculture. It is believed that the proposed program would bring substantial benefits to the Kansas portion of the Missouri River Basin. The Kansas State Board of Agriculture would cooperate in every way possible in development of the program. We urge that the proposed program be authorized by Congress and that funds be made available for putting it into effect.

Conservation and improvement measures for grassland and cropland which have been carried on in the past are of particular interest to Kansas because

of the relatively large proportion of the State devoted to grazing and crop production. Acceleration of that work would be highly desirable.

There is also a great deal of interest in that part of the proposed program dealing with stabilizing measures for small watercourses. That constitutes a substantial part of the program and is considered as being of the utmost importance. Such construction, little of which has been undertaken in Kansas, would provide substantial flood-control benefits along the small watercourses and in the upper reaches of the larger watersheds.

Most of the counties in Kansas have been organized as soil-conservation districts which, in cooperation with the Soil Conservation Service, provide technical assistance for landowners in the development and construction of drainage and irrigation projects, farm ponds and detention reservoirs, terraces, and other such improvements. The districts would be in position to cooperate in putting the proposed program into effect as funds are made available.

HAROLD E. STOODT.

Mr. HOPE. Joe Brown, Washington, Kans.

STATEMENT OF JOE BROWN, WASHINGTON, KANS.

Mr. BROWN. Mr. Chairman, Mr. Poage, and members of the committee, I am not a clean-up man. I cannot summarize the remarks that have been made here today. I have been sitting here very interested because I am interested in this problem. I have made a few quick notes by way of memoranda which I would like to express to you. In considering the problem of flood control, we must consider what the thinking in Kansas is, and I think that is divided into the upper reaches and lower reaches of the watershed. The people involved must be mindful of their rights and responsibilities. The solution to the problem must contain the rights of the people, and those exercising their rights must be cautioned of the responsibility in the solution to the problem.

The people in the upper reaches have the right to the first use of the water because it falls on their property. They also have the responsibility in that to the Conservation Service so there is no flood in the lower area or inundation. The people in the lower reaches have the right of protection from inundation and floods, but with that right they also have the responsibility that their flood control must not be wholly at the expense of the upper landlord.

We have heard several remarks this morning that Tuttle Creek would not have saved Manhattan. I think that is quite a byword in a number of households in Kansas, and expressed on the floor of the House by Mr. Cannon in the discussion which might have held you gentlemen up from coming home. It was expressed in the rain pattern last July. The people here today by and large are asking for a comprehensive survey embodying all the factors introduced.

Mr. HOPE. This concludes the meeting, and I desire to thank all of you who have testified and all of you who came to participate in the meeting, either as spectators or speakers, and I want to thank Albert Cole and his staff for the work involved in the preparation of the meeting, and all others who were credited in any way with making preparations for this meeting and making it a success, which I am sure it was. It was very helpful to the committee to have the benefit of all the suggestions and ideas that were placed before the committee today, and I can assure you that they will all receive the most careful consideration.

Mr. COLE. I want to thank you for the fine hearing today, and we are indebted to you for the time given us here. Thank you.

SOIL CONSERVATION AND FLOOD CONTROL

THURSDAY, NOVEMBER 1, 1951

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON SOIL CONSERVATION AND FLOOD
CONTROL OF THE COMMITTEE ON AGRICULTURE,
Sioux Falls, S. Dak.

The subcommittee met at Sioux Falls, S. Dak., Hon. W. R. Poage, Texas, chairman.

Also present: Hon. Clifford Hope, Kansas; Hon. Charles B. Hoeven, Iowa; and Hon. Harold O. Lovre, South Dakota.

The CHAIRMAN. The meeting will please come to order.

All of those who care to sit in on these hearings will be very welcome. We are glad to have you here.

I would like to suggest to those who are present this morning that this is simply a subcommittee of the Agriculture Committee of the House of Representatives, and that we are meeting not simply to discuss any Missouri River Valley plan, as I know you have had a great many discussions, but rather to consider the program of agricultural flood prevention—or, as some people call it, flood control—as it applies to the entire United States. Of course, emphasis at a meeting in Sioux Falls must necessarily be upon that portion of the program that involves the Missouri Basin, because, obviously, most all of you present live within that basin and, obviously, everyone of us is most interested in the area in which they live and make their livelihood. So, it is perfectly natural and perfectly understandable that most of the discussion this morning will probably revolve around the impact of the agricultural flood-prevention program upon the Missouri Basin. We would hardly expect that there would be much discussion of the Colorado River or the Suwanee River in a meeting here, but we do want everyone to realize that this committee is charged with responsibility for a program including the entire United States.

In the legislative procedure this committee must first authorize a flood-prevention program in a drainage basin before the Agriculture Department can proceed to carry on accelerated activities in that area. Then, before they can get any actual work done, the Appropriations Committee must provide an appropriation so there will be money to carry on the work. At the present time there are 11 of these agricultural flood-prevention programs authorized in the United States. Those 11 are getting only about $6 million a year. You can get a pretty good idea that we are not preventing many floods in the United States when we are spreading our money that thin. When you bear in mind that one dam in this State will probably cost in excess of $200 million, you can see the agricultural flood-control program has not had a great deal of money, when you realize the entire United States has only spent about $6 million a year on that program.

This committee must decide whether that program should be extended. We are not making the decision as to the money that should be made available to expand it. That much be made by the Appropriations Committee, but we do hope that when we have completed our consideration of the problem we will be able to give some recommendations to the Congress as to some idea of the number of the agricultural projects we should carry on, the amount of money that should be available, and whether they are actually worth while or not. This committee hopes that they have no preconceived ideas on the matter.

We started in Texas. We have visited the Washita project in Oklahoma. We have visited the upper reaches of the Platte River in Colorado. We have held hearings in western Kansas, and yesterday in Topeka, Kans. Today, this will be our farthest north point in the Missouri Basin for the time being.

The program in which we are particularly interested is holding water in place as far as possible. Certainly this committee does not come to you people to tell you the Department of Agriculture has a program that can stop all floods. On the contrary, and looking at these river valleys that have been cut through here, we know that great floods of the past have cut out great valleys, and we anticipate there will be floods in the future. We do believe that it is possible to materially check a substantial amount of runoff, and that to the extent that you can cause the water that falls at a given point to sink into the ground at that point, that you cause the water to become a blessing, at least in this western country, rather than become the curse of water that runs on the surface, because it is water that runs over the surface that causes floods. This water that runs over the surface erodes the land and destroys the productivity of our soil. So this program, which I like to call "flood prevention" as distinguished from "flood control" attempts to keep the water where it falls. Obviously, under this program or under that, we know we can't be expected to keep all of the water where it falls, although there are those who say that a proper agricultural program should keep it all. I simply can't get that optimistic about it. We are doubtful that any program would keep all of the water where it falls.

The program in which we are specifically interested is that which lies between the point where the farmer alone is interested in the production of his own soil and the time that the water becomes a great raging torrent on the large streams, where the Army engineers' program takes over. We feel there is a substantial area in there that has been neglected in the past. Possibly it is not worth the expenditure of public funds on. We want to know whether it is. We want the opinion of any of the citizens who care to express a view either to the effect that it is worthwhile to spend more money to achieve these results or whether it is not worth spending money on. If it is not, we want to stop it. If it is worth spending money on, we want to spend it. We are seeking a proper balance within the whole country to determine the relative needs of various sections of the country.

If you will look at any of these maps, you will see this is a very broad country, with many rivers and many acres of land subjected to erosion. It is a tremendously expensive proposition.

I had hoped that all of the members could be here. We are expecting our neighbor and friend from across the line here in northwestern Iowa to be present, and I think he will come in. We have

with us a former chairman of the Agriculture Committee, I think probably the best-informed man in the United States on the subject of agriculture. He is certainly as good a friend of agriculture as the farmers in this country ever had. Mr. Hope, of Kansas. [Applause.]

And then, of course, we have as one of the highly respected and one of the very valuable members of the committee your own local Congressman, a gentleman that I think came into the Congress under a considerable handicap in that he succeeded a great man, your senior Senator, Karl Mundt. I think it is hard for any man to come in and succeed him, but Harold Lovre has succeeded in doing that, and doing it in a most wonderful way. The Members of Congress, the members of our Agriculture Committee, where we know him best, and all of the other Members have all come to respect and admire the ability, the character, the personality of your own local Congressman, who I want to preside this morning, and who I am going to ask to take over in the conduct of this hearing.

The Hon. Harold O. Lovre.

Mr. LOVRE. Thank you very kindly, Bob.

Friends of agriculture, I must make a confession. I feel highly honored this morning. I think it is a rare privilege to have the opportunity to preside over this meeting. This is the first time it has been my privilege to preside. May I say this: That to my dying day I certainly will thank, from the bottom of my heart, my good friend Bob Poage, of Texas, my chairman, who gave me my initiation, so to speak, in presiding over one of these meetings. I am particularly happy that Bob Poage and his subcommittee saw fit to come to the great State of South Dakota. We are here on a very, very important mission. I can think of no other subject of more importance than soil conservation and flood control. I am also very happy to have our good friend and neighbor Congressman Hope with us. We all know Cliff Hope in this part of the Middle West. As Bob stated, Cliff was the chairman of the Agriculture Committee in the Eightieth Congress. He certainly is a friend of agriculture, just like Bob Poage is. These men certainly have agriculture at heart. They want to do everything they can for this great basic industry of our country.

I am not going to take much of your time this morning, other than to make this brief statement. I have had presented 25 names, 25 persons who would like to testify. Mr. Heimberger tells me there are 10 or 12 more. We want to hear everyone. This is your meeting. We want to give ample time so everyone can tell us what they think about this program. We may have to limit the time that you can speak. We will start out hoping that you will limit your testimony to not exceed 10 minutes. If we do that, if we confine our time within that period, then we can give everyone time to testify before this committee. We are going to run straight through until 1:30 this afternoon. If anyone of you who want to testify that has not presented your name, I certainly would appreciate it if you would give your name to our chief counsel, Mr. Heimberger, because we do want to hear you.

I also want to take this opportunity of expressing our appreciation to the Sioux Falls Chamber for making this room available to all of us today. When we arrived in Sioux Falls early this morning we were each given a glad hand of welcome by means of a letter. This morning we were invited to breakfast put on by the Sioux Falls Chamber.

We are indebted to the Sioux Falls Chamber for their generous hospitality in making this meeting possible.

Our first witness this morning will be Mr. Gladwin Young, of the United States Department of Agriculture. Mr. Young was with us yesterday in Topeka and was with us the day before in Colby, Kans.

NOTE.—The testimony of Mr. Young is already before the committee, and appears at pages 91 and 285.

Mr. LOVRE. Another member of our subcommittee just walked into the room. He is our neighbor and friend to the south, Charley Hoeven, of Iowa. We are very happy to have Charley with us. I am very happy that time permits him to come to Sioux Falls and take part in this meeting today.

Since we started a few minutes ago a number of people have entered the room. May I remind you once again this is your meeting, and if any of you would like to testify before this subcommittee we want to hear you. So, if you will kindly get in touch with Mr. Heimberger, our counsel, and give him your name and address, what organization you represent, he will turn it over to us so we can call your name in order. I am going to call the witnesses in the order that they have been presented to me. That is the course we will follow throughout the hearing. The next witness I have listed is the Governor of South Dakota, but it is my understanding he has not arrived as yet. And, therefore, I will call on Mr. L. V. Ausman, secretary of agriculture of South Dakota. Mr. Ausman.

STATEMENT OF L. V. AUSMAN, SECRETARY OF AGRICULTURE OF SOUTH DAKOTA

Mr. AUSMAN. Mr. Chairman, we are very happy to welcome you to South Dakota.

After arriving in Sioux Falls last night, I had a long-distance call from Governor Anderson. He asked me to represent him in event he cannot get here. I am bringing you his greetings. If he gets here, he will speak for himelf, but I want to bring you his greetings in event he might not be able to get here.

Secondarily, I did not understand at the time I was asked to appear at this hearing that the man from the Department of Agriculture would be here. So, some of the testimony that I have prepared had to do with this 30-year plan of the Department of Agriculture. Since arriving here this morning and finding out that they had a man giving that testimony, I have revamped my testimony considerably. While I will mention a few things that have to do with that program, I am going to leave out a large part of what I had, especially since when I got here I found out there are 30 or 40 of you farmers here who want to have something to say. I would be the last man in South Dakota to deny them that privilege.

I have lived and worked for the past 25 years within a stone's throw of the Missouri River and the Sioux River and their tributaries, from Pierre, S. Dak., and Sioux Falls, S. Dak., respectively, to Sioux City, Iowa. I know their problems intimately, and I also know of—

1. Their terrible destructiveness in the many acres of fertile farm land that is torn from the banks of the Missouri and carried to the Delta of the Mississippi.

2. The many acres of fertile bottom land that is covered with silt and its crop-productiveness greatly reduced every year.
3. Hillsides denuded of their topsoil so that they become less productive every year.
4. Roads and bridges destroyed.
5. Gullies and ditches growing to great depths across field and farms in the span of a few years, in the southeastern part of South Dakota, especially.

Flood control is of vital importance to every American citizen. My testimony will deal with the proposed 30-year flood-control plan and my experiences and thinking as a result of discussing these problems with thousands of South Dakota people.

The agricultural program recommended by the United States Department of Agriculture for the development and conservation of land, water, and forest resources and for flood control in the Missouri River Basin development program has much to commend it. These activities are interdependent upon each other, and each must be developed for the success of all. The program is a comprehensive plan which, if properly integrated and carried out, could bring about the proposed development within the next 30 years. This development, if left on a hit-or-miss basis, might take a century or more. The program as proposed does not offer any new innovations. It intensifies the work already being done in land use and conservation of our natural resources and water control. I believe that its chief merit lies in the recommendations that through coordinated efforts of all levels of interested groups into a common effort that the results may be achieved much more quickly than could otherwise be done. These goals are the securing of a better water supply, a sustained lumber industry, opportunity for recreation, preventing the destruction of our natural resources, and stopping the loss of life and property by floods.

Stock water supplies are essential for erosion control, better growth of grasses and legumes, and the uniform use of grazing lands. This means the construction, improvement, and use of more than 500,000 new ponds, 30,000 springs and seeps, and 78,000 wells for water. It means that thousands of stock water dams and storage reservoirs must be constructed at or near the head of creeks, small streams, and other tributaries to our rivers. This is seemingly in direct opposition to the building of large dams for irrigation, flood control, power and navigation.

From the viewpoint of flood control, that is the most efficient manner to control floods, that is, that of holding water at its source, or where it falls. Water held on land where it falls, not only furnishes water for stock ponds, but for improved pastures, hay and crop lands, and will also have a very beneficial effect on the holding back of sediment, which will, unless checked, eventually effect the large river dams. I am very much in favor of stock water dams, terraces, contours, water spreaders and pasture furrows to hold water where it falls. I do not believe that even with this intensified effort as proposed that sufficient amount of this work will ever be done to materially effect the amount of water that will be impounded by our river dams for navigation, irrigation, power and flood control.

Forests and forest ranges have many uses, for timber, for grazing, for recreation and wildlife, and the protection and control of water

supplies. It is recommended that tree planting be done on 5,000,000 acres of forest, and 400,000 acres of forest ranges be reseeded. In addition it is contemplated that two and a half million acres of shelter belts and windbreaks be planted to conserve moisture and check erosion, to protect crops, livestock, and farmsteads. Additional measures that are recommended are for at least 60,000 miles of diversion ditches and dikes to route floodwater from lands and terraced fields.

Still another factor that must be given serious thought in this program is our increasing population. In the United States our population is increasing at the rate of a million and a quarter every year. This means there are 4,000 more mouths to feed every day. In order to do this we cannot afford to lose one single acre of productive land.

This proposed program is designed to accomplish this very thing. It is estimated that the cost of this recommended program is $3,092 million. This is a very nominal figure in this age of billions considering the results that will be accomplished, but for the future of our great country, there is no program of greater importance. If the future of our great country is to be maintained, a program of this kind is of the greatest importance. This program will be accomplished by encouraging farmers and private owners to protect their land against erosion and depletion, and to operate their farms and ranches to withstand the punishment adverse weather inflicts on lands and its inhabitants.

Mr. LOVRE. I think we should interrupt to introduce our own senior Senator, Hon. Karl Mundt, of Madison.

Mr. AUSMAN. In applying these conservation plans, farmers and ranchers will have available to them the best technical assistance from the Federal Government through its service in cooperation with appropriate State agencies. In addition, these farmers and ranchers will be reimbursed in part for the cost of installation and initial application of these practices.

Partial reimbursement recognizes, first, that many benefits accrue directly to the public from these practices. Among these benefits are conserved resources, flood control, better water supplies, increased recreational opportunities, and the reduced need of public assistance in event of adverse weather.

In addition, new installations and practices often require major adjustments in farm operations. For these reasons, the public should bear a portion of the first costs of such a program. However, the administration of all phases of this program should be on the local or State level.

Unwise management is common throughout the basin. With the combined effort of research, electrification, credit, extension education, and other assistance from Federal and State agencies, much of this can be changed for the benefit of all of the people living in the basin.

Experience in the area of the basin is limited to the time of the first settlement, which occurred but little over a century ago. Three times during that space of time, severe and prolonged droughts have afflicted the basin. These droughts have caused great losses by wind erosion and great hardship to people living in the area.

Water and land are inseparable and any program must treat them as such. The proposed program does this, and if properly developed, will do much to offset the ravages of drought. More cover crops,

strip farming, grasses, and legumes will tend to conserve the water that does fall. Controlled grazing will help to maintain pastures that will withstand drought conditions.

I have always been a great supporter of all conservation measures. It is the only way we can maintain our soil and soil fertility for our children. This proposed program, boiled down to its final analysis is conservation. Its goal has real merit. If all agencies, Federal, State, and local can and will work together for its accomplishment, it will mean that the Missouri River Basin will be a productive valley for thousands of years to come.

Thank you.

Mr. LOVRE. Thank you very kindly for your most interesting and constructive statement.

Are there any questions on the part of this committee?

Mr. POAGE. No.

Mr. HOEVEN. No.

Mr. LOVRE. May I ask one question? The success of this program will depend to a large extent on the cooperation of all. Is there any question in your mind that that cooperation will not be forthcoming in connection with program?

Mr. AUSMAN. Not on any scale of any size. There may be isolated areas or isolated individuals, but, in general, I don't think there will be any dragging of feet at all.

Mr. LOVRE. I realize we are speculating, but would you say that 70 to 80 percent of our people would be willing to cooperate along the lines you have testified to?

Mr. AUSMAN. If they can be assured of benefits that will accrue to them, I am sure that is right. I believe that I might make one more statement. I believe, from year to year, you will find that is more and more true as our young people are coming through these schools and getting more education on these matters and come into the picture and take over. This is no criticism of the older men, but they have not had the opportunity to know what these things are and its relation to them. They are slow to change. Their sons coming on are getting this education and I think that means there will be more every year.

Mr. LOVRE. In other words, it will take a certain amount of education in order to put the program into effect?

Mr. AUSMAN. It will take a lot of education. Education is probably the most vital thing to put this program across. We all know, whether we like it or not, that educational processes move rather slowly.

Mr. LOVRE. There is one other question I would like to ask you. In connection with conservation districts, how many districts do we have in South Dakota?

Mr. AUSMAN. Fifty-three now; we just approved one last week.

Mr. LOVRE. What portion of South Dakota is already organized?

Mr. AUSMAN. Approximately two thirds. I might also say that 90 percent of the two-thirds is in the east river area where we have intensified farming.

Mr. LOVRE. Thank you very kindly.

The nert witness is Mr. Obed Wyum, president, North Dakota REA Cooperative.

STATEMENT OF OBED WYUM, PRESIDENT, NORTH DAKOTA REA COOPERATIVE

Mr. WYUM. Mr. Chairman and members of the committee, I am in rather a tough spot. I didn't even know I was coming down here until day before yesterday, and I took in another meeting and I haven't anything prepared at all. I have to talk entirely off the cuff.

I am a farmer first of all. I live on a farm in North Dakota. I am also representing the State-wide association, North Dakota REA Cooperative. I am their president. The Farmers Union asked me to present our viewpoint, the chairman of their policy and action committee.

As you know, we have a decided interest in the Missouri Basin development. In North Dakota we are very appreciative of the development that has already been launched. We like the Garrison Dam. We like the work the Bureau of Reclamation has launched for us, but we are fearful of some of the planning that has gone into it. What we really want is an over-all, integrated planning job done so that we get full development of the Missouri Basin. We don't feel we are going to get that with the work that is already planned. For instance, every day we are uncovering mistakes and problems that have not been solved in the work that is already done. We don't think it is too late to cure some of these shortcomings yet. We would like to see this done.

We feel there is a very strong move for a basin-wide inventory of our resources as a basis for integrated and intelligent planning. That would mean that first we should have an agriculture plan that will make a survey and inventory of all of the land we have in the basin. We need to know what we have; its best land use; what it is best adapted for; what its potentialities are. When it comes to irrigation there needs be an intensive study so we can know the lands that are fit for irrigation and those that are not. We need to know the conservation practices that are needed to do the best job of conserving the land, soil, and water. We believe in conserving our water at its source to as great an extent as possible. All these and all these other things, as reservoirs for flood control, as auxiliary needs. This inventory needs to include a side line, a survey and inventory of our water resources, and the best use that that can be put to. How much we will need for irrigation, and so forth, for navigation. We need the whole picture of flood control. Then we need to have this survey include an inventory of our minerals, including the mineral deposits we don't yet know about but we are hoping to find in both North and South Dakota and Montana. Then our wild life. Then our energy resources. The REA. We are very much concerned about the disposition that is made of our energy resources and the development of them.

After you get this inventory accomplished and know what we have in the basin, then we have to integrate this information with what plans we now have. For instance, if we get an agriculture plan, then we have to integrate that with the Pick-Sloan plan, so we get as full development as possible to have for our valley. So far as the Farmers Union is concerned, we don't think you are going to be able to get that without an overall authority of some kind that has the authority to

bring about this integration. Apparently Congress is not ready to give us that yet. So in the meantime we do hope you will go ahead with these other measures that everybody ought to be for. That is, a sound agriculture plan, and then they could go ahead and integrate that with the existing plans that we now do have, the Pick-Sloan plan.

As far as REA is concerned, we have a definite program that we are for and that we think is sound. That is, in the development of the hydropower we are having here in the Missouri Basin. I believe it is absolutely fundamentally necessary for the welfare of our people that after the power is produced at the dam site that it be transmitted throughout the entire basin here by a high voltage grid system that belongs to the people. What we already have in North Dakota is the Bureau of Reclamation high-voltage line. We would like to see that extended to all of the other States so we have it tied up in one great system that will serve the entire basin. We don't assume or advocate that that will eliminate private utilities. The North Dakota plan does not do that at all.

Under the North Dakota plan we have this high-voltage grid system owned by the Bureau and we have agreements with our private power utilities to help serve the municipalities and REA Cooperative to the extent that their system needs it. I think that is a sound system. We would like to see that integration throughout the entire basin, but in order to protect our REA and the people in town, we do insist on having this high-voltage grid system. We hope we can get that for the entire basin as the backbone of a future power development.

That does involve this matter of the so-called Keating amendment, we had up in the last Congress. We are very much opposed to that sort of thing because that will take away the right of using our own resources through the cooperatives in competition where it is necessary. We may never want to do it. If we get this high-voltage grid system we probably can get along very well with agreements with our private power utilities. But the REA and those directly interested feel we must never be denied the privilege of expanding our facilities if we find it desirable or necessary.

One thing more that is part and parcel of the design for better living in our country is to have telephone service. We hope that as part of the basin development we can get telephone service for every farm home in the basin. We have made good beginnings in North Dakota. We are hoping that Congress will cooperate and give us sufficient funds so we can get the telephone co-ops launched to serve the people that are still in lack of service. We have asked for and are securing the cooperation of the telephone industry. In our State, for instance, we have got operation with the Northwestern Bell Telephone people. They have agreed to cooperate with us in helping to provide telephone service to all of the farmers in the State. That has been very pleasing to us and we believe they will carry through on it. We think that should be forthcoming for the entire basin. Without cooperation between the people and the industry we never will get adequate telephone service.

I think that covers the field so far as we are concerned. Something that Congress should give us immediately is this agriculture plan so that we know what we have in the way of agricultural re-

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sources and how they can best be utilized. After we get that we will be in position to integrate that with the Pick-Sloan plan and resolve some of the doubts that we now have. I don't know if there will be enough water to give us suitable hydroelectric supply if we have prolonged drouth, and in addition enough water to irrigate the lands that will be under irrigation. One of the things that has made it lag in this whole basin development had been local participation in planning. In many cases the plan has probably been very well done for that place, but local people don't realize or don't know. Until they know and understand what is being done you will never have a long-range State program.

I believe in cooperation. I want a full development of the Missouri Basin. We don't want partial development. We are for whatever will help us get that.

Mr. LOVRE. Thank you very kindly. Are there any questions?

Mr. HOPE. I don't want to take much time in questioning because I know there are many witnesses here and our time is limited, so I will hold my questions down, but you have brought up some very interesting subjects and I am sure we could go into them profitably if there were time.

I want to ask you if you do not think that any program of this kind, involving conservation of the land and our water resources, must begin on the individual farm? We have to preserve the soil on the individual farm and make the best use of the water that falls on the individual farm. I am thinking of that, perhaps, morely strongly because we have had some very severe floods in Kansas, and we have seen not only what a blessing the water is, but what a curse it is when it is not properly controlled. It was brought out in our hearings at Topeka that any program of this kind must have for its foundation an agriculture program which attempts to keep right on the land the soil that is there, and to restore all we have lost of our soil, and to keep on the land as far as we can the water which falls there instead of letting it become a destructive force that it does when water is not properly controlled. Do you agree with that viewpoint?

Mr. WYUM. Yes; I do, entirely. That is very sound and fundamental.

Mr. HOPE. You think, then, the Missouri Basin agriculture program, in general, must be the foundation of any sound program to develop the resources of this great basin?

Mr. WYUM. Yes; I do.

Mr. HOPE. One other question. Your testimony indicated that you feel there has not been sufficient planning so far and in connection with this program you particularly mentioned reclamation and indicated you felt there had not been sufficient investigation of the capability of the land which it is contemplated will be irrigated. Perhaps there are other questions involved in the quantity of water available and the method of getting it to the land, and so forth. I would like to ask you, do you feel that a mistake is being made in going ahead and spending these tremendous amounts of money on these projects without further study? I am speaking particularly of reclamation.

Mr. WYUM. I think it is very unwise just to be going ahead without knowing what your problems are going to be. For that reason it is basic that we have this inventory and this survey of what our lands are and the uses they could be put to and how to be put to, as soon as

possible. That could be done in about a year's time if it were actually gone after seriously. One of the developments that is sure to follow when this thing is broadened is that in addition to your plan of irrigation by water in ditches, that circular irrigation has enormous possibilities. With the power we will have available we can probably make irrigation go much farther than we ever dreamed we could.

Mr. HOPE. You think there should be more study than has been given to it before we venture into these programs?

Mr. WYUM. Yes; I do. We don't want to see these projects delayed. We want to speed it up. We also want to cure any mistakes that might have been made until this information is available.

Mr. LOVRE. In the projects that have been authorized, it is your opinion they should be proceeded with?

Mr. WYUM. As far as I know; yes.

Mr. HOEVEN. I am, of course, interested in how Federal money is being spent. It is always a great problem for Congress to know how it should be spent. One of the witnesses said that this program would approximate $3,000,000,000. I am just wondering, in this résumé or analysis you want to make of the Missouri River Basin, if it is not high time for us to get down to brass tacks and consider where the needs are in this country as compared with the needs of foreign countries. While we are trying to do our part to build up the economy of other countries, we must not forget the needs of the American people here at home. I make special reference to problems in the Missouri River Basin.

Mr. WYUM. I am sure all of the people in the Missouri Basin will agree with you that we must not neglect the Missouri Basin. We also think we should do those things necessary to build up the rest of the world. But, certainly, we can't any of us afford to neglect the things that will make us stronger in our own country here at home.

Mr. HOEVEN. You appreciate the problems confronting the Congress.

Mr. WYUM. Yes; we do.

Mr. LOVRE. I am going to interrupt the proceedings right now to ask if our senior Senator has any questions?

Senator MUNDT. I would like to ask a question or two. I was glad to hear what you said about the telephone situation as it is developing in North Dakota and to feel we can call on your groups to deal with the formula which Congress has worked out for providing relief in the telephone situation in rural areas. Your programs, as I understand them, were directed to making more money available for the present program rather than changing the program. Is that it?

Mr. WYUM. Yes. There are lots of our folks close to this and studying it and trying to bring definite development into North Dakota. We feel that we have one problem and that is the matter of equity requirements. We find we have a lot of folks living in small towns who have difficulty in raising $45 or $50 equity requirements

that they presently have to raise. If arrangements could be made that increase our rates enough to pay for that, which amounts to less than 20 cents per month, it would go far toward helping to bring telephone service to all of the people. As it is presently going we probably have 15 or 20 or 25 percent who will stay out of the program for the lack of equity requirements.

Senator MUNDT. You think the average farmer in North Dakota would be willing to pay the increase?

Mr. WYUM. Yes, I think most everyone would be willing to pay 20 or 25 cents a month extra in lieu of this $45 or $50 equity requirement.

Senator Mundt. One other question. I was wondering if you could give us any guidance as to what you would do with the $5,000,000 which Congress might have available for river development. Where would you place the priority?

Mr. WYUM. I am afraid I would place it in the Missouri Basin.

Senator MUNDT. I am glad to hear you say that. Thank you.

Mr. HOPE. I am sure you know this, but I think it should be brought to the attention of this group here that the distinguished chairman of the subcommittee, Mr. Poage, is an authority on rural telephones just as he is the foremost congressional exponent of rural electrification. We are very, very happy, of course, to follow Mr. Poage's leadership in that matter. What I wanted to ask you is to develop a little more information about this requirement you mention. This equity requirement. I assume that is in the law or in the regulations of the REA. Is that correct?

Mr. WYUM. Yes. They are administering it on that basis, for what would seem a very good reason. In other words, as I understand, the law requires the lines must be made on a sound physical basis. They have asked for equity requirements in carrying out that understanding of the wishes of Congress in the matter.

Mr. HOPE. You feel that the requirement is too difficult to meet out in this country, and you are suggesting that possibly some other requirements, which would assure the safety of the investment of the Government should be studied? Is that what you have in mind?

Mr. WYUM. Yes.

Mr. HOPE. Have you any suggestions as to what could be substituted for the requirement?

Mr. WYUM. I don't think there would be any damage result at all if you used the same formula with telephone as you did with REA. Let the farmer get his service from his REA co-op, and pay off on a monthly rate. It has worked out OK. We are satisfied it would work out on the telephone. They use this argument against the telephone being put on the same basis, that the farmer doesn't have the same investment in his telephone that he did in his electric service because of putting in wiring, etc. But every farmer, I am satisfied, if he gets an opportunity to get service, and this telephone service will give us dial service, and that is available, will not let his telephone go unless he absolutely has to. If you should have an economic condition where the matter of raising the monthly telephone bill was an issue, whether or not you had $45 or $50 cash equity in it, would not make any difference. He won't let his telephone go unless he absolutely has to any more than he will let his electric service go after he once gets it.

Mr. POAGE. May I say, Mr. Wyum, that I have talked to the authorities a number of times about this very matter. We did not contemplate they would make any such requirement as that when we passed the law. It didn't occur to me. Mr. Wickard came and talked to me before he put this thing in. I agree it does have the effect you suggested, in keeping a number of people off. We feel the basis of the rural telephone people in making the requirements a great deal more stringent than the electric people is for solvency and for the certainty of repayment for the loan. They are required to administer it in such a manner that the loan will be repaid. He says, in justification that the average farmer who takes electricity has an investment between two and three hundred dollars before he gets his electricity, in wiring his home, and that, actually, his investment then in appliances is much larger, washing machines, and so forth. That the farmer has an investment that cannot be used unless he continues to take electricity. Whereas, in the telephone he has no such investment at all. That if a man is simply allowed to contract the telephone to the end of one month by merely paying his monthly bill, that the possibility of the loan going unpaid is much greater than it is in connection with the electrical service, because we know we are now faced with the same kind of competition from the telephone companies that we met from the electric companies 15 or 20 years ago. With all due respect to the Bell Telephone Co., it has never served anyone but itself formerly. The Bell Telephone Co. has never interested itself in rural service as such. Since this bill was passed, Bell has built more lines than it has built for many, many years in the rural areas before, and they have everyone of them been to urban and thickly settled areas, which has made it most difficult to get out to territory that would properly have rural telephone systems through proper cooperatives.

Mr. Wickard recognizes that these existing telephone companies and cooperatives are organized along the lines of REA, but they must face the most severe kind of competition at the hands of the Telephone Trust, because if there is a trust in the United States, it is A. T. & T. Mr. Wickard recognizes unless there is something there to tie a farmer to the rural line, that the A. T. & T. and its subsidiaries can come in and make offers to those farmers of a slightly lower rate. I don't think your farmers are any different from the farmers in Texas, and when they get an offer of a lower rate they will change their telephone and take it from the other fellow when they don't have anything invested, but if they have got this equity invested in their co-op, or any other corporation, then they are not nearly so likely to change. Security for the loan is much more sound since Congress very definitely made him certify as to the security of those loans, and he has to carry out the requirements that we have a solvent operation. While I agree that it is keeping a lot of farmers from getting telephones, I don't believe a raising of the rate would in anywise accomplish the thing that Mr. Wickard is attempting to accomplish.

Mr. WYUM. We don't in any way hold this against Mr. Wickard, but if we are going to get any relief on this it is going to have to come from you folks. If we have 15 or 20 percent of our people who don't feel that they can take telephone service on account of this, it will automatically increase the rate for the rest of us who do. Please consider that, too.

Mr. LOVRE. Thank you, Mr. Wyum.

Our next speaker will be Mr. Vincent N. Anderson, of Iowa State College. Mr. Anderson.

STATEMENT OF VINCENT N. ANDERSON, OF IOWA STATE COLLEGE, AMES, IOWA

Mr. ANDERSON. Mr. Chairman and members of the House Committee on Agriculture, I, as a member of the extension service and experiment station of Iowa State College, appreciate the opportunity of appearing before you today and to give you some of our ideas.

I have passed out a prepared statement here. I am not going to read it in detail, but would like to refer to a few sections of the typewritten part of it.

As has already been pointed out, Iowa is a small part of the Missouri Basin. About one-third of the State is in the Missouri Basin. However, we have about 10 or 12 percent of the population of the Missouri Basin. We have a very high percent of the productive land in the Missouri Basin. Much of the land in Iowa in the Missouri Basin is rather hilly and rolling, but on the Missouri bottom it is subject to erosion and subject to drainage problems. There has been serious gully erosion during the less than 100 years it has been farmed.

I would like to call the committee's attention to the bottom of page 2, starting from the second to last paragraph there, I would like to read a page of it.

Where land use shifts and soil conservation are profitable to the farmer, public responsibilities are limited largely to research and education. Research is necessary to discover and develop the practices and systems required to attain conservation. Education is needed to translate research into action on individual farms. If desired, educational process can be sped up considerably through incentive payments and technical assistance to farmers.

Farmers recognize that conservation is profitable over a period of years but for various reasons the individual farmer fails to follow the desired practices. In such instances, society may help remove existing obstacles in order to bring about adoption of practices that are in the public interest of conservation.

Public responsibilities for soil conservation, however, may and frequently do go beyond these practices profitable to individual farmers. This is particularly true where—

1. Public interest is longer term and more lasting than the interests of the individual farmer.

2. Benefits that accrue away from the farm where the improvements are made may justify greater expenditures on a particular farm than can be undertaken profitably by the farmer.

These principles have long been recognized in land-reclamation projects and in the construction of flood-control levees and dams. But only in recent years have they been incorporated into soil-conservation programs. From the viewpoint of soil conservation, the Little Sioux watershed program in northwestern Iowa may serve as an example. This program, now in its early stages of development, covers 4,502 square miles of productive but rapidly eroding soils The program has a twofold objective: (1) to hold the soil and water

in place, thus benefiting the land on which conservation improvements are made, and also equally important, to hold soil and water from damaging downstream areas with floods and silt. The estimated goal is to reduce maximum water flow by 20 percent and siltation by 55 percent; and (2) to help maintain the productivity of the land for the benefit of future generations as well as this generation.

The Little Sioux watershed program operates principally in Woodbury, Monona, Ida, Cherokee, Plymouth, O'Brien, Clay, Osceola, and Dickinson Counties in Iowa. It was initiated in 1945. When this program was established there were no provisions made for research or extension education and indications are that the rapid development of this program has been seriously handicapped because this was not done.

The Iowa Agricultural Experiment Station, in cooperation with research agencies of the United States Department of Agriculture has carried on studies at the central station at Ames and on four outlying experimental farms in the basin area. These studies provided information which is being used in the educational program in the area and has resulted in substantial progress in improving soil, crop, and livestock management practices. While real progress has been made, much additional work needs to be done to determine the potential effects of the agricultural program on a small and large watershed basis, on the production of crops and control of runoff and erosion. Research on the effectiveness of various practices such as crop rotation, contouring, strip cropping, terracing and other conservation measures, conducted at the soil conservation experimental farm in Page County and the western Iowa experimental farm in Monona County, suggest the real possibility of materially reducing runoff and erosion of the deep permeable loess soils of this area. Unfortunately, these studies have been confined to small experimental area, and the exact effectiveness of these practices when applied to large watershed areas is not known. Until information of this type is available on large watersheds, sound efficient planning as to the effectiveness of the agricultural program on the over-all flood-control program of the area cannot be made. While large sums of money have been made available and real progress has been made in action phases of the program based on the best information available today, it is unfortunate that adequately financed research has not been in progress to supply basic data so badly needed in planning an over-all efficient program today. Many years will be required to accomplish the over-all program of the basin.

In our opinion more consideration needs to be given to activating a research program that will, at the earliest date possible, provide basic information to properly evaluate the effectiveness of the various phases of the program. The various action groups are to be commended on the programs that are now in effect, but the fact still remains that basic information is not available in many of these areas to provide for the most efficient planning of the over-all program. An accelerated Missouri River Basin development program places a heavy responsibility on the State agricultural experiment stations and the research divisions of the Department of Agriculture to provide basic facts and objective analysis of these facts. This is necessary to avoid costly mistakes and to help direct basin development along desirable lines. The State agricultural experiment stations of the basin have

furnished much valuable information on which present programs are based, but if the necessary information for sound planning is to be made avaliable in time to provide guidance for this rapidly expanding program, an accelerated agricultural research program must be largely financed by Federal funds. The directions of the agricultural experiment stations of the North Central regions at a meeting in July 1949, adopted the following resolution:

> It is recommended that at least 50 percent of any appropriation made by Congress for the support of an accelerated research program in the Missouri River Basin, be made available to the State agricultural experiment stations in the basin on a grant-in-aid basis for research in cooperation with the Federal research agencies, in order that the most effective attack may be made upon the problems involved in the basin, and in order that the most efficient use may be made of the tax dollar.

The extension program has been conducted in the basin for close to 40 years. Many of the early programs were aimed to help the farmers solve the problems of soil and water losses. There have been watershed demonstrations, experimental farms, and soil surveys made through the basin. They have pointed out to the farmer the importance of establishing a sound lane use on his farm. Farmers, businessmen, and municipalities in Iowa in that portion of the basin have been asking for a stepped-up program. This is illustrated by the organized groups in southwest Iowa and others. Experience has shown duties of our county agents with existing programs has almost completely taken up their time. We think in Iowa we should have some additional men out there assisting the county extension directors and the county agents. They have made, we feel, some contribution; but, just as research requires time, so does education require time to inform people of the problems and stimulate them to adopt new processes which must be brought into the program. Experience has shown that, until people of the area thoroughly understand the problem as well as the things that need to be done to correct the condition, progress is very slow. Not only is progress slow, but all individuals do not move into the practices at the same rate, and the adoption of better practices by one individual may be entirely nullified by neighbors who fail to adopt improved practices. Only when the majority of the people of the area understand the problem and are willing to go ahead will there be most efficient use made of the various action programs. The State agricultural extension services are neither able nor should they be expected to provide the necessary funds for an accelerated educational program, since the results that accrue from the program have benefits beyond the county and State borders. And accelerated extension program in all counties of the area is long past due, and we feel that definite steps should be taken by Congress to make funds available to the Agricultural Extension Service on a grant-in-aid basis. In order to carry on a stepped-up program in Iowa on such a program as indicated in House Document 373, assistance over and above that used in the regular program will be necessary. This would include assistance at the county level to develop and initiate an expanded program and assistance at the State level to guide such a program's development.

In the prepared material here are a number of points calling attention to our extension program. I will not take time to point those out. We do not want you to believe that we think the agricultural program is everything. We recognize that, regardless of what is done

on the land, there still will be excessive runoff from melting snow and large rains of high intensity for which dams and levees are required for protection, but we do feel that a complete program on all the land will keep most of the silt at home and will contribute more to the overall flood-control program than is generally recognized. This will extend the effective life of reservoirs constructed for flood control and power.

Apparently it has not been recognized by all that basic research data on which the plans of the area should be developed and a well-informed public through an educational program are the essential forerunners of an efficient action program. The adoption of a sound agricultural program requires relatively small amount of expenditure be made for research, education, and technical assistance from public funds, with the individual farmer responsible for adopting most of the practices without expense to the public. Studies have shown that the adoption of good land-use and conservation practices more than pays for their establishment, and with proper understanding of the benefits from these practices by more farmers will result in increased production of feed and food and greater income for the individual landowner. The need for increased production to supply food for our ever-increasing population and because of the present national emergency is a recognized fact. A sound, efficient, permanent agriculture program can accomplish this. Everyone working with the basin program has the obligation to see that their resources are used efficiently. The Iowa Agricultural Experiment Station and the Iowa Agricultural Extension Service stand ready to make the maximum contribution possible to the development and carrying out of this Missouri River Basin program.

I would like to call the committee's attention to the four references I have here. The first one shows Iowa, with the darkened portion there that includes the Missouri Basin. The next three are publications we have prepared and are using in this Missouri Basin area. One of them deals with guiding and conducting extension activities in the Missouri Basin area. The second one is a study that was made and report made of the proposed Government programs for developing the Missouri River Basin, the last one called Teamwork Toward Better Land Use and Soil Conservation in Western Iowa.

I think, Mr. Chairman, that is all I have here.

(The complete prepared statement submitted by Mr. Anderson follows:)

STATEMENT OF THE AGRICULTURAL DIVISION, IOWA STATE COLLEGE, ON THE AGRICULTURAL PROGRAM FOR THE MISSOURI BASIN

(By Vincent M. Anderson, district extension supervisor, extension service, Iowa State College)

The agricultural extension service and the agricultural experiment station of the Iowa State College of Agricultural and Mechanic Arts appreciate the opportunity to appear before this group and present material relating to the Missouri River Basin agricultural program.

BACKGROUND

The Missouri River and 8 of its principal tributaries drain water from 38 Iowa counties. Twenty-three counties are entirely within the drainage basin; seven have more than one-half of their area in the basin; and eight have less than one-half of their land in the basin. Approximately one-third of the State is in the area. While only 3.2 percent of the Missouri Basin is in Iowa, from 10 to 12

percent of the population of the basin and a considerable percentage of the highly productive land is in the Iowa section of the Missouri River Basin.

Upland soils total 83 percent, and bottom-land soils 17 percent, of the area in Iowa. The rolling to steep irregular topography of the upland area has been farmed intensively to intertilled crops, resulting in serious sheet and gully erosion in a relatively short period of 80 or 90 years that this land has been under the plow. The problem of inadequate drainage and flooding from upland runoff water is an acute problem of the bottom lands.

Silt-laden runoff water from the uplands that empties into the natural or artificial drainage channels in the bottom lands chokes the channels with silt, causing overflow to adjacent lands. This overflow damages crops, fences, buildings, and adds to the flood hazard of tributaries and major streams below. Maintenance of adequate open ditch channels to carry runoff from upland water-artificial drainage channels in the bottom lands chokes the channels with silt, sheds across the bottom land to the outlet stream frequently costs more in maintenance in a few years than the initial channel cost. The 615 drainage enterprises in the Missouri River Basin counties of Iowa have not been enough to provide adequate flood protection or adequate surface drainage outlets, and so on the average serious crop losses occur 1 year out of 5 on 10 percent or more of the bottom land.

The problems of sheet and gully erosion on the uplands is perhaps even more serious than the problems of drainage and flooding on the adjacent bottom lands. The highly erosive nature of the soils, their steep topography, and the high percentage of erosive intertilled crops in contrast to the low percentage of conserving forages have and continue to result in serious reduction in productivity of these lands.

Where land-use shifts and soil conservation are profitable to the farmer, public responsibilities are limited largely to research and education. Research is necessary to discover and develop the practices and systems required to attain conservation. Education is needed to translate research into action on individual farms. If desired, the educational process can be speeded up considerably through incentive payments and technical assistance to farmers.

Farmers recognize that conservation is profitable over a period of years, but for various reasons the individual farmer fails to follow the desired practices. In such instances society may help remove existing obstacles in order to bring about adoption of practices that are in the public interest of conservation.

Public responsibilities for soil conservation however, may and frequently do go beyond those practices profitable to individual farmers. This is particularly true where—

1. Public interest is longer term and more lasting than the interests of individual farmers.
2. Benefits that accrue away from the farm where the improvements are made may justify greater expenditures on a particular farm than can be undertaken profitably by the farmer.

These principles have long been recognized in land-reclamation projects and in the construction of flood-control levees and dams. But only in recent years have they been incorporated into soil-conservation programs. From the viewpoint of soil conservation, the Little Sioux watershed program in northwestern Iowa may serve as an example. This program, now in its early stages of development, covers 4,502 square miles of productive but rapidly eroding soils. The program has a twofold objective: (1) to hold the soil and water in place, thus benefiting the land on which conservation improvements are made and, also equally important, to hold soil and water from damaging downstream areas with floods and silt; the estimated goal is to reduce maximum water flow by 20 percent and siltation by 55 percent; and (2) to help maintain the productivity of the land for the benefit of future generations as well as this generation.

The Little Sioux watershed program operates principally in Woodbury, Monona, Ida, Cherokee, Plymouth, O'Brien, Clay, Osceola, and Dickinson Counties. It was initiated in 1945. When this program was established, there were no provisions made for research or extension education, and indications are that the rapid development of this program has been seriously handicapped because this was not done.

HOW THE EXPERIMENT STATION CAN CONTRIBUTE

The Iowa Agricultural Experiment Station in cooperation with research agencies of the United States Department of Agriculture has carried on studies at the central station at Ames and on four outlying experimental farms in the basin

area. These studies provided information which is being used in the educational program in the area and has resulted in substantial progress in improving soil crop and livestock management practices. While real progress has been made, much additional work needs to be done to determine the potential effects of the agricultural program on a small and large watershed basis, on the production of crops and control of runoff and erosion. Research on the effectiveness of various practices such as crop rotations, contouring, strip cropping, terracing, and other conservation measures, conducted at the soil conservation experimental farm in Page County and the Western Iowa Experimental Farm in Monona County, suggest the real possibility of materially reducing runoff and erosion of the deep permeable loess soils of this area. Unfortunately these studies have been confined to small experimental areas, and the exact effectiveness of these practices when applied to large watershed areas is not known. Until information of this type is available on large watersheds, sound, efficient planning as to the effectiveness of the agricultural program on the over-all flood-control program of the area cannot be made. While large sums of money have been made available and real progress has been made in action phases of the program based on the best information available today, it is unfortunate that adequately financed research has not been in progress to supply basic data so badly needed in planning an over-all efficient program today. Many years will be required to accomplish the over-all program of the basin. In our opinion more consideration needs to be given to activating a research program that will, at the earliest date possible, provide basic information to properly evaluate the effectiveness of the various phases of the program. The various action groups are to be commended on the programs that are now in effect, but the fact still remains that basic information is not available in many of these areas to provide for the most efficient planning of the over-all program. An accelerated Missouri Basin development program places a heavy responsibility on the State agricultural experiment stations and the research divisions of the Department of Agriculture to provide basic facts and an objective analysis of these facts. This is necessary to avoid costly mistakes and to help direct basin development along desirable lines. The State agricultural experiment stations of the basin have furnished much valuable information on which present programs are based; but, if the necessary information for sound planning is to be made available in time to provide guidance for this rapidly expanding program, an accelerated agricultural research program must be largely financed by Federal funds. The directors of the agricultural experiment stations of the north central regions at a meeting in July 1949 adopted the following resolution: "It is recommended that at least 50 percent of any appropriation made by Congress for the support of an accelerated research program in the Missouri River Basin be made available to the State agricultural experiment stations in the basin on a grant-in-aid basis for research in cooperation with the Federal research agencies in order that the most effective attack may be made upon the problems involved in the basin and in order that the most efficient use may be made of the tax dollar."

HOW EXTENSION CAN CONTRIBUTE

The cooperative educational program of the Iowa Agricultural Extension Service is providing assistance for people of the area. A county extension director is available in each county. A county extension home economist is in half the counties; youth assistants are in three counties; and an assistant county extension director in soil conservation has been provided in eight counties of the area.

Organized extension work in this area began about 38 years ago. Many of the early extension programs were aimed at helping farmers solve problems of soil and water losses, lack of drainage facilities, and lack of adequate moisture. Results from the establishment of experimental farms, watershed demonstrations, the Little Sioux watershed program, soil surveys, outlying field experimental programs, and initiation of land-use and conservation programs on the farm have pointed out to the people of the area the importance of establishing a sound land-use program for the area.

Farmers, businessmen, and municipalities in that portion of the basin which is in Iowa have been asking for a stepped-up program. This is illustrated by the organized groups in the Nishnabotna watershed, the Nodaway Valley watershed, and others.

Experience has shown that, with the various duties of the county extension director, it has not been possible for one person to conduct the accelerated

educational program necessary to adequately inform the people of the scope of the Missouri River Basin program and of its possible effect on social and economic welfare. The proposed Missouri River Basin program includes many changes that are not now commonly accepted practices in the area. Just as research requires time, so does the education required to inform people of the problem and to stimulate them to adopt new practices that must be brought into the program if agriculture is to make its maximum contribution in the over-all flood-control program. Experience has shown that, until people of the area thoroughly understand the problem as well as the things that need to be done to correct the condition, progress is very slow. Not only is progress slow, but all individuals do not move into the practices at the same rate, and the adoption of better practices by one individual may be entirely nullified by neighbors who fail to adopt improved practices. Only when the majority of the people of the area understand the problem and are willing to go ahead will there be most efficient use made of the various action programs. The assistant county extension directors in soil conservation were provided with this object in mind. The work of the assistants in soil conservation has paid dividends. If an intensive educational program is to be set up to keep ahead of the action program, additional assistants for concentrating on the conservation program of the area must be provided. The State agricultural extension services are neither able nor should they be expected to provide the necessary funds for an accelerated educational program, since the results that accrue from the program have benefits beyond the county and State borders. An accelerated county extension program in all counties of the area is long past due, and we feel that definite steps should be taken by Congress to make funds available to the Agricultural Extension Service on a grant-in-aid basis.

The regular extension program is fully occupied in carrying out the duties and responsibilities of previously established programs. In order to carry out a stepped-up program in Iowa on such a program as indicated in House Document 373, assistance over and above that used in the regular program will be necessary. This would include assistance at the county level to develop and initiate an expanded program and assistance at a State level to guide such a program's development.

The Iowa Agricultural Extension Service should be in a position to intensify the educational program by—

1. Informing all of the people of the scope and intent of the Missouri River Basin program with its possible effect on their social and economic welfare.
2. Accelerating the program in land use and soil and water conservation in order to acquaint farm people with the necessity of and the techniques needed.
3. Assist farmers in adjusting their livestock, machinery, buildings, and labor to a cropping pattern consistent with good land use.
4. Assist farmers with problems of drainage and with management of land protected by levees.
5. Teach farm families the efficient and effective use of electrical energy when more electrical energy becomes available from the basin projects.
6. Teach the principles of farm and home planning and management to enable farm families to achieve their goal for better living.

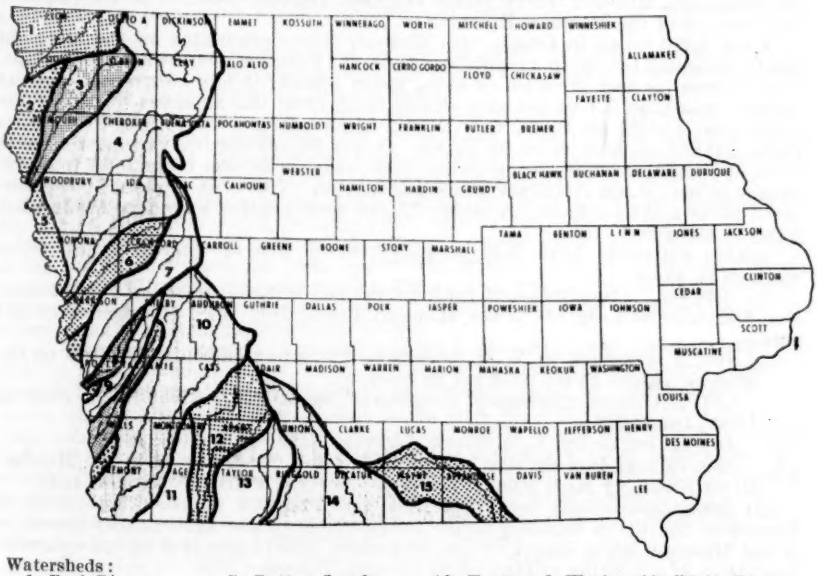
COORDINATION NEEDED

We would not want you to believe that we think the agricultural program is everything. We recognize that, regardless of what is done on the land, there still will be excessive runoff from melting snow and large rains of high intensity for which dams and levees are required for protection, but we do feel that a complete program on all the land will keep most of the silt at home and will contribute more to the over-all flood-control program than is generally recognized. This will extend the effective life of reservoirs constructed for flood control and power.

We believe that evidence to date indicates that over-all coordinated planning and action has not been achieved in the Missouri River Basin program. The proposals in House Document 373 give consideration to many activities that should be included in the various phases of an over-all program which will help provide for an efficient permanent agriculture of the area. Apparently it has not been recognized by all that basic research data on which the plans of the area should be developed and a well-informed public through an educational

program are the essential forerunners of an efficient action program. We strongly urge for your consideration that all phases of the over-all program be adequately recognized and those phases that have been neglected or slow to be put into effect be activated in order that information is available on which to base the most efficient program possible with all Federal, State, county, and civic organizations working together as a team on the over-all program of the basin. In considering the agricultural program, another very important fact should be recognized. The adoption of a sound agricultural program requires that a relatively small amount of expenditures be made for research, education, and technical assistance from public funds, with the individual farmers responsible for adopting most of the practices without expense to the public. Studies have shown that the adoption of good land-use and conservation practices more than pay for their establishment, and proper understanding of the benefits from these practices by more farmers will result in increased production of feed and food and greater income for the individual landowner. The need to increase production to supply food for our ever-increasing population and because of the present national emergency is a recognized fact. A sound, efficient, permanent agriculture program can accomplish this. In addition, that program, if applied to all of the farm lands of the area, contributes materially to the over-all flood-control program of the basin. Until an activated agricultural program is planned and coordinated with other phases of the over-all program which are of equal importance, we will not be accomplishing the most possible with the minimum of effort and expenditure on the part of the public. Everyone interested and working with the basin program has the obligation to see that their resources are used efficiently. The Iowa Agricultural Experiment Station and the Iowa Agricultural Extension Service stand ready to make the maximum contribution possible in the development and carrying out of this very important Missouri River Basin program.

MISSOURI RIVER BASIN IN IOWA



Watersheds:

1. Rock River.
2. Sioux River.
3. Floyd River.
4. Little Sioux River.
5. Bottom Lands.
6. Soldier River.
7. Boyer River.
8. Mosquito River.
9. Keg Creek.
10. East and West Nishnaborna River.
—. Tarkio River.
11. Nodaway River.
13. Platte River.
14. Grand River.
15. Chariton River.

A GUIDE FOR EXTENSION ACTIVITIES IN THE MISSOURI RIVER BASIN OF IOWA

SECTION I: THE MISSOURI RIVER BASIN IN IOWA[1]

GENERAL

Regional development programs have been suggested and initiated in the basin of the Missouri River. The Missouri River Basin program is the largest coordinated development of a river basin authorized by the Congress of the United States. It is estimated that the ultimate Federal expenditure in the Missouri River Basin may exceed $4½ billion. The Federal Congress on December 22, 1944, approved a coordinated plan commonly known as the Pick-Sloan plan. In this Flood Control Act of December 22, 1944, and July 24, 1946, Congress authorized a total amount of $350,000,000 to be expended by the Corps of Engineers, and $350,000,000 to be expended by the Bureau of Reclamation for partial accomplishment of the program. The total appropriation by the United States Congress up to July 1, 1948, was $728,000,000 for planning, construction, and related work.

The control of the water in the upland areas to prevent soil wastage, the conservation of water for irrigation, and the use of hydroelectric power present is, in most cases, a tremendous impact to any individual farm family and community in the basin.

The Extension Service, with the educational services of the United States Department of Agriculture in cooperation with the land-grant colleges and local people has a particular and peculiar responsibility in helping farm families to understand and adjust their operations to this huge program.

To understand a little more fully the size of the Missouri River Basin, the following is quoted from a publication by the Department of the Army, Corps of Engineers, Missouri River Basin Division, Omaha, Nebr., The Development and Control of the Missouri River:

"Over 2,400 miles in length, the Missouri River originates on the slopes of the Continental Divide in Yellowstone National Park and southwestern Montana, and courses its way through, or along seven States; it has an average slope of slightly less than 1 foot per mile downstream from the Montana-North Dakota State line, and below Sioux City, Iowa, winds along a valley 1½ to 17 miles wide, flanked on both sides by bluffs. It has 30 tributaries varying in length from 100 to 1,000 miles and draining areas varying in size from 2,000 to 90,000 square miles; it has countless minor tributaries. The area drained by the Missouri River and its tributaries covers 529,300 square miles, including 9,700 square miles in Canada."

Certain materials have been prepared which are of interest to extension workers in Iowa.

(1) MD 430. Compilation of Information and Material Relating to the Extension Educational Program in the Missouri Basin, July 1948. Contained in this was—

(*a*) A statement by V. M. Anderson, district extension supervisor, on the Missouri River Basin program in Iowa.

(*b*) Extension educational program in the Missouri River Basin, State of Iowa, June 1948.

(*c*) Letter to Dr. E. A. Stark, Lincoln, Nebr., November 1947.

(*d*) Educational Service in Relation to Soil Conservation in the Missouri River Basin, by Karl Knaus, Extension Service, USDA, November 1947.

(2) Recommendations for an Educational Program by the Cooperation of Extension Service in Relation to the Development of the Agricultural Resources of the Missouri River Basin. (158, September 1948), prepared by an extension committee at a meeting of land-grant colleges, Laramie, Wyo.

The Missouri River and its tributaries drains water from a total of 38 Iowa counties. Twenty-three counties are entirely within the drainage basin; seven have more than one-half their area in the basin; and eight have less than one-half their land in the basin. (See map 1 attached.) Approximately 11,000,000 of the 35,000,000 acres in Iowa are drained by the Missouri River.

The principal tributaries include (beginning on the northwest) the Big Sioux, Little Sioux, Boyer, West Nishnabotna, East Nishnobotna, Grand, Thompson, and Chariton Rivers.

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[1] Report prepared by the "Long-time" subcommittee of the Land Use and Conservation Committee, at the request of Extension Administration. Accepted by the Land Use and Conservation Committee, March 12, 1949.

A land-use and management program is already under way in the watershed of the Little Sioux. Included in this area are all or parts of Monona, Woodbury, Ida, Sac, Plymouth, Cherokee, Buena Vista, O'Brien, Clay, Palo Alto, Osceola, and Dickinson Counties. (See H. Doc. 268, Watershed of the Little Sioux and Your Stake in the Little Sioux Project, Extension Pamphlet 125.)

Since several counties included in the Missouri River Basin have only a small portion of their land in the basin, the following counties were arbitrarily omitted in the discussion—Buena Vista, Carroll, Madison, Monroe, Guthrie, and Palo Alto. The 32 remaining counties have been divided into 3 groups having similar soils, erosion problems, and farm operation patterns. (See map 2.) They are:

Area No. 1:	Area No. 2:	Area No. 3:
Lyon	Woodbury	Adair
Osceola	Ida	Adams
Dickinson	Monona	Union
Sioux	Crawford	Clarke
O'Brien	Harrison	Lucas
Clay	Shelby	Taylor
Plymouth	Audubon	Ringgold
Cherokee	Pottawattamie	Decatur
Sac	Cass	Wayne
	Mills	Appanoose
	Montgomery	
	Fremont	
	Page	

THE SOIL

The soils of the basin are predominantly prairie soils. They were derived to a large degree from loess which in a large part originated in the Missouri flood plain.

The entire area has been covered by two or more glaciers. The Nebraskan (the earliest) and the Kansan covered the entire area. The soils derived from till in area No. 3 are largely from the Kansan.

Subsequent to those glaciers, a loess deposition occurred. Sometime after, the Iowan glacier covered nearly one-half of the State. The irregular line beginning in western Plymouth County at the Iowa-South Dakota line extending south and eastward, which divides the GPS soil association area from the MIH and M soil association area, is the approximate southern boundary of the Iowa glacier in the basin area. (See map 2, Principal Soil Association Areas in Iowa.)

During the retreat of the Iowan additional loess deposits occurred: (1) South of the Iowan's advance, the loess source was primarily from the Missouri flood plain with additional deposits coming from the Iowan plain, (2) loess depositions also occurred on the Iowan from a source presumably originating on an outwash plain west of the Big Sioux River.

The topography pattern in northwest Iowa, specifically of the loess-derived soils in Lyon, Osceola, Sioux, O'Brien, Clay, Plymouth, and Cherokee Counties is characterized by the long, gentle, smooth slopes. This is the influence of the Iowan glacier. Contrasted with this is the area of loess-derived soils south of these counties. Here a rolling to sharply, rolling to steep, and irregular topography pattern occurs. This is a result of the underlying older Kansan glacier which had considerable more geological erosion. Generally speaking, the erosion problem is much more severe in the southern area (areas 2 and 3).

The principal soil associations of Iowa are shown on map 2. These association areas in the basin may be briefly described as follows:

Moody (Mo) occurs in the extreme northwest corner of Iowa where annual rainfall is the lowest in the State. The area is moderately dissected with gentle slopes, except immediately adjacent to the Big Sioux River. A medium-textured loess blanket, 6 to 12 feet thick, covers the area except on the steepest slopes, where a calcareous compact and plastic glacial till outcrops. The entire area was originally covered by prairie.

Galva-Primghar-Sac (GPS) and Marcus, Primghar, Sac (MPS) soil associations are found in northwest Iowa. The area in general is well drained. Slopes are gentle except near major rivers. A few areas are nearly level and are scattered throughout the MPS association area. The ridges and most of the slopes are covered ith a medium textured loess 4 to 12 feet thick in the GPS area and 3 to 4 feet thick in the MPS area. On the steeper slopes a compact, slowly

permeable till is sometimes exposed. The area, for the most part, was covered by prairie.

The Monona-Ida-Hamburg (MIH) soil association occupies a belt of hilly and steep land bordering the Missouri River bottoms. The material from which these soils have formed is a coarse-textured loess. These soils are permeable to rapidly permeable. Because of their low clay content they are usually low in organic matter and in moisture-holding capacity. Loess depths range from 30 to 100 feet thick.

The Marshall (M) soil association occupies a belt of rolling land in western Iowa adjacent to the MIH area. These soils developed under grass vegetation in a thick deposit of medium-texture loess, ranging in depth from 20 to 30 feet.

Sharpsburg-Shelby-Winterset (SSW) soil association area. These soils have developed under grass vegetation, although a few small areas were formerly forested. In this area the ridges and flat upland divides are covered with a medium-textured loess about 12 to 17 feet thick. On the steeper slopes the loess has been largely removed by geological erosion exposing the underlying weathered till mostly of the Kansan age.

The Shelby-Grundy-Haig (SGH) soil association is found in southern Iowa. These soils have developed under grass vegetation, although a few areas were forested. Where the Grundy-Haig occur together there are broad flat ridges with a few hills, whereas in the areas where more Shelby occurs (derived from the Kansas till) the area is hilly with narrow flat loess-covered ridge tops.

The Shelby-Seymour-Edina (SSE) is found in southern Iowa. In this area the ridges have a cover of fine-textured loess about 6 to 8 feet thick. On the slopes geological erosion has removed all of most of the loess, exposing the underlying weathered till which is mostly of the Kansan age.

DRAINAGE SITUATION

1. *The Missouri bottom land between Council Bluffs and Sioux City.*—From 10 to 35 percent the cropland is in need of drainage restoration. Only an inappreciable acreage is drained by tile. One-third to one-half of this is usually drowned out. Practically complete crop losses have resulted in 5 of the past 20 years.

Local people recognize crop damages to be caused primarily by: (1) levee breaks on main stem drainage ways, (2) lack of adequate means of removing surface water, (3) Missouri River high water floods. They have indicated that the last two factors seem to be of about equal importance.

Very little farm land is adequately drained. The water table in the bottom land area is frequently within 12 inches of the ground level during April, May, and June. The practical use of tile is very questionable. Farmers have been slow to develop suitable farm drainage systems because outlet facilities are limited.

2. *Capital invested in public drains (source: 1940 Federal Drainage Census).*—

Counties	Capital invested in public drains	Average cost per acre when completed	Drainage enterprises	Counties	Capital invested in public drains	Average cost per acre when completed	Drainage enterprises
Adams	$166,098	$13.98	4	Osceola	$1,098,093	$15.49	44
Audubon	234,026	15.58	5	Page	570,219	12.05	16
Cass	443,144	16.14	8	Plymouth	79,318	13.22	3
Clay	1,642,557	12.20	83	Pocahontas	2,939,855	10.43	95
Crawford	311,128	23.44	7	Pottawattamie	1,401,865	15.10	35
Decatur	118,100	8.90	5	Ringgold	316,296	14.56	4
Dickinson	1,922,320	16.76	73	Sac	1,133,985	10.71	73
Fremont	1,160,761	12.35	15	Shelby	668,135	16.61	11
Harrison	1,152,238	8.63	51	Taylor	173,251	12.44	4
Mills	452,588	8.69	17	Woodbury	762,554	8.23	17
Monona	1,637,043	10.80	24				
Montgomery	346,518	14.94	10	Total	14,050,413		
O'Brien	157,694	9.51	11				

3. *Percent of cropland with drainage (includes both tile and open ditch).*—

0 to 9.9 percent (counties):
- Appanoose
- Audubon
- Decatur
- Plymouth
- Ringgold
- Shelby
- Taylor

10 to 24.9 percent (counties):
- Adair
- Adams

10 to 24.9 percent—Con.
- Cass
- Cherokee
- Lucas
- Lyon
- Montgomery
- Page
- Sioux
- Union

25 to 49.9 percent (counties):
- Crawford
- Dickinson

25 to 49.9 percent—Con.
- Fremont
- Harrison
- O'Brien
- Osceola
- Pottawattamie
- Sac
- Woodbury

50 to 74.9 percent (counties):
- Clay
- Monona

Over 75 percent: None

4. *Percent of cropland needing drainage rehabilitation.*—

0 to 4.9 percent (counties):
- Adams
- Appanoose
- Audubon
- Cass
- Cherokee
- Crawford
- Decatur

0 to 4.9 percent—Con.
- Ida
- Lucas
- Lyon
- Montgomery
- Plymouth
- Ringgold
- Shelby
- Sioux

0 to 4.9 percent—Con.
- Taylor
- Union

5 to 9.9 percent (counties):
- Adair
- Page
- Pottawattamie
- Woodbury

10 to 14.9 percent (counties):
- Dickinson
- Fremont
- Harrison
- Mills
- Sac
- O'Brien
- Osceola

15 to 19.9 percent (counties):
- Clay
- Monona

Over 20 percent (counties):
- None

THE LAND USE PATTERN

Agronomists have generally considered that in 1941 Iowa farmers had the most desirable land-use pattern in history with reference to the ratio of intertilled crops to sod crops. Accordingly a comparison is made with 1946 to observe changes in land use that occurred during the war period.

Land use by 3 areas in Iowa in the Missouri River Basin

Area	Crop	Year	Acres	Percent of total cropland [1]	Percent increase [2]
1. Lyon, Osceola, Dickinson, O'Brien, Clay, Plymouth, Cherokee, Sac, Sioux.	Corn	1941	1,132,000	43	
		1946	1,477,000	55	+30
	Small grain	1941	948,000	36	
		1946	804,000	30	−15
	Sod crops	1941	558,000	21	
		1946	427,000	16	−23
2. Woodbury, Ida, Monona, Crawford, Harrison, Shelby, Audubon, Cass, East Pottawattamie, West Pottawattamie, Mills, Montgomery, Page, Fremont.	Corn	1941	1,632,000	43	
		1946	1,922,000	50	+18
	Small grain	1941	808,000	22	
		1946	893,000	23	+10
	Sod crops	1941	1,307,000	35	
		1946	1,030,000	27	−21
3. Adair, Adams, Union, Clarke, Lucas, Appanoose, Wayne, Decatur, Ringgold, Taylor.	Corn	1941	553,000	28	
		1946	635,000	32	+15
	Small grain	1941	282,000	14	
		1946	301,000	15	−7
	Sod crops	1941	1,120,000	57	
		1946	1,054,000	53	−6

[1] Represents the percent of total land in any particular crop during 1941 or 1946.
[2] Represents the increase of a particular crop in 1946 over 1941.

Source: Annual Farm Census, 1941 and 1946.

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The land used during 1941 and in 1946 reflects to a great extent the soil resources of each of the three areas. As is indicated, each area increased substantially the intertilled acreage during the war period and at the same time brought extra land into cropland acreages. That is to say, a greater acreage was reported under cultivation in 1946 over 1941 for each area. Thus the two columns (1) percent of total cropland in corn, small grain, and sod crops for 1941 and 1946, and (2) percent increase for corn, small grain, and sod crops in 1946 over 1941.

If one looks specifically at the relation of sod crops to intertilled crops for the two areas, the following is the result.

Area	Year	Sod crops for each 100 acres intertilled
1	1941	42
	1946	29
2	1941	80
	1946	58
3	1941	202
	1946	166

Source: The Social and Economic Aspects. (Data obtained from the United States Census of Agriculture for 1945, vol. 1, pt. 9, unless otherwise indicated.)

In 1945 there was a total of 63,518 farms in the basin representing 30.4 percent of the farms in Iowa.

In 1945	Area 1	Area 2	Area 3	State average
Number of farms per county	2,001	2,159	1,746	2,110
Percent of farms in the basin	28.3	44.2	27.5	
Percent of farms owner-operated	37	43	50	45
Percent operated by part owners	12	12	15	13
Percent operated by tenants	51	45	35	42
Average age of farm owner ..... years	51.2	51.6	52.3	51.8
Average age of farm tenant ..... do	40.8	41.3	42	41.1
Percent of farm operators on their farm less than—				
1 year	15	17	18	51
1 to 4 years	27	29	32	28
5 to 9 years	19	16	15	18
10 years and over	39	38	34	39
Index of the level of living in 1945 computed by Bureau of Agricultural Economics	178	160	132	162
Percent increase in the level of living from 1940	22	26	21	22
Percent of farm homes with—				
Running water	34	44	15	31
Electricity	68	53	30	62
Telephone	79	76	77	79
On all-weather roads	82	31	35	66

Based on the 1940 general census the level of formal education of the farm population 25 years old and over and all children attended school by ages was as follows:

	Areas 1 and 2 combined	Area 3	State average
	Percent	*Percent*	*Percent*
Adults with more than an eighth grade education	32	36	33
Youth attending schools:			
14-to 15-year-olds	87	89	89
16-to 17-year-olds	69	73	70
18-to 20-year-olds	22	21	21

	Area 1	Area 2	Area 3	State average
In 1945 the average size of farm was ..... acres	186	176	176	165
These farms represented an investment in—				
Lands and buildings ..... dollars	24,898	18,843	11,233	18,739
Machinery and equipment ..... do	2,209	1,789	1,090	1,868
Livestock ..... do	4,194	3,460	2,641	3,302
Based on the number of acres per farm, the percent of farms in the various size group was—				
0 to 69 acres	10	15	16	16
70 to 139 acres	17	24	26	26
140 to 179 acres	33	23	20	24
180 to 259 acres	21	22	19	20
260 to 499 acres	18	14	16	13
500 acres and over	1	2	3	1
Number of tractors per farm	1.06	.86	.53	.87
Autos per farm	1.19	1.06	.95	1.07
Trucks per farm	.17	.15	.08	17
Number of workers per farm, including operator and family labor	1.55	1.53	1.52	1.56
Percent of farms using hired help was	11	9	4	11
The farms in 1944 on the average had—				
Crop sales of	$1,622	$1,214	$287	$1,079
Livestock sales of	5,962	4,906	2,867	4,435
Total	7,584	6,120	3,154	5,514

	Area 1	Area 2	Area 3	State average
The grouping of the farms on the basis of level of income in 1944 was as follows:	*Percent*	*Percent*	*Percent*	*Percent*
$1 to $599	3	7	9	7
$600 to $1,499	5	10	16	9
$1,500 to $2,499	6	10	19	11
$2,500 to $3,999	12	17	24	17
$4,000 to $5,999	21	19	17	20
$6,000 to $9,999	29	20	10	21
$10,000 and over	24	17	5	15

The analysis of the social and economic aspect of the Missouri River Basin in Iowa indicates that there are some important problems to be solved as far as the people and the decisions they must make about their living in the area. The thing that stands out the most is the relative low level of income and resources of the farm families in area 3 as compared to areas 1 and 2 and as compared to the State as a whole. This indicates the problems are nowhere near uniform for the basin area from an economic standpoint.

Another important factor is the small percentage of farm operators that have operated the same farm 10 years or more. Even in area 1 in which the income is the highest and well above the State average only 39 percent have operated the same farm 10 years or more while in area 3 only 34 percent have.

CROP AND LIVESTOCK PRODUCTION

Crop production data on farms in 3 areas of the Missouri Basin

	Area 1	Area 2	Area 3	State average
Average size farm.....acres	189	177	176	168
Intertilled acreage per farm	84	70	41	62
Small-grain acreage per farm	46	32	19	28
Sod crop acreage per farm (all hay plus plowable pasture)	24	37	67	36

Source: Annual Farm Census, 1946.

Livestock production on farms in 3 areas of the Missouri Basin

	Area 1	Area 2	Area 3	State average
Cattle and calves, per farm	33	28	24	26
Cattle and calves sold, per farm	19	19	12	14
Sows and gilts for spring farrow, per farm	12	9	5	9
Hogs and pigs sold, per farm	78	61	44	64
Sheep and lambs, per farm	11	7	10	6
Cows milked, per farm	6	5	5	6
Chickens on hand, per farm	190	139	130	159

Source. United States Census of Agriculture, 1945, vol. 1, part 9.

SECTION II. COOPERATIVE AGRICULTURAL EXTENSION ACTIVITIES

EARLY WORK IN LAND USE AND CONSERVATION

Organized extension work in the Missouri Basin began about 36 years ago. Concern for good land use was expressed by the first county agent in the basin in his first annual report. He stated: "The cropping and soil end of farming has been given considerable attention. Larger yields of crops is one aim of the county agricultural extension program. But larger yields secured in such a way as to keep up the fertility of the soil is the only proof of a permanent system of agriculture."

Objectives and problems listed in the early programs included—

1. Conservation of the soil.
2. Proper land use by improved crop rotations.
3. A solution to the tremendous increase in erosion.
4. Control of gullies.
5. Proper use of lime and fertilizers.

Following are a few extracts taken from the 20-year history of extension work in several Missouri Basin counties:

Fremont County.—Extension work started in 1918. In 1921 numerous fertilizer demonstrations were established. In the early twenties many carloads of lime were shipped into the county. The county was one of the early ones to include programs on the value of terracing, contouring, rotation of crops. The county extension service assisted the establishment of CCC camps for soil-conservation work in the county.

Harrison County.—Early demonstrations were conducted on "stopping gullies" and later included all phases of soil conservation; improved crop rotations, as well as supporting erosion-control practices. In 1939 the program planning committee requested that greater emphasis be placed on erosion control, and at the same time requested assistance of a CCC camp for demonstrational work on erosion problems.

Mills County.—Crop and fertilizer tests were established in 1920 and 1922, respectively. Terracing was first tried in 1924. Assistance was given in the establishment of a CCC camp in 1935. By 1939, nearly 50 miles of terraces had been established, and by 1940 a substantial number of farms had adopted some erosion-control practices.

Montgomery County.—The first terracing demonstration was established in 1922. In 1939 the farmer-cooperator in this early terracing demonstration was

elected as one of the commissioners of the Montgomery County Soil Conservation District. This county was a part of the West Tarkio watershed demonstrational project which was started in 1933. At the same time a CCC camp was located in the area.

The extension program in the county was very active in assisting and developing early-day projects in soil and water conservation.

O'Brien County.—During the years 1914 to 1918 the Extension Service sponsored short courses in soil fertility and soil testing.

Page County.—The agricultural extension program began here in 1914. From early reports major emphasis was to help "make two blades of grass grow where one grew before." During World War I large acreages of sod crops were plowed to grow wheat and corn. Attention then was focused on better land use—"of getting the rolling acres back to grass," pointing out in 1939 that the most serious long-time problem facing Page County farmers was the loss of soil rolling land comprising 75 to 80 percent of the county.

Plans were initiated in 1929 to locate a soil-conservation experimental farm in Page County. This was established in 1931 and is in operation today.

The West Tarkio soil-conservation watershed project was established in the county. Two CCC camps were also located in the county. County extension personnel and farm leaders gave much time in assisting the development and operation of these early soil-conservation activities.

Ringgold County.—As early as 1920 educational activities were directed toward the conservation of the soil. A total of 1,921 erosion-control dams (on farms) were built, and some years later the first terraces were established.

Adams County.—In 1919 two soil-erosion-control demonstrations were established.

Appanoose County.—In 1920, 22 carloads of lime had been shipped into the county through efforts of the extension-sponsored program.

Crawford County.—Making his first annual report the first county agent of Crawford County stated, "Ditch washing or soil erosion is probably the biggest problem in the county." Although the problem was recognized early by a few leaders, it was not until about 30 years later that organized action was taken to correct these problems.

The above reports point out early recognition of the seriousness of soil erosion, and the activities, as they were then understood, to obtain soil and water conservation. Over the years farmers have become acquainted with the seriousness of the problem and have taken various organized approaches to accomplish certain goals.

During this early period thousands of demonstrations, tours, meetings, and tests were conducted by extension workers. New crops like alfalfa and bromegrass were introduced. Improved varieties were perfected and brought to the attention of farm people.

Following the passage of the soil-conservation district law in 1939, county extension workers assisted in organization of such districts. Nearly all the counties in the basin now have soil-conservation districts. In practically all counties, the county extension director is the secretary of the county board of commissioners.

County extension workers also assisted in the initiation of the AAA (now PMA) and for a number of years the county agent in most counties was secretary of the AAA board.

COUNTY AGRICULTURAL PLANNING

In 1936 and 1937, almost all counties in Iowa participated in county agricultural planning activities. County committees made up of farm leaders from all parts of the county met regularly to consider the land-use problem and needs for their county. The extension service in the State officered and locally assisted county committees by supplying materials and facts. The committee's recommendations were submitted to the extension service of Iowa State College and to the Program Planning Division of the Agricultural Adjustment Administration and widely discussed within the counties. County reports are on file at the extension service office and in the library of Iowa State College.

All counties in the Missouri River Basin area have reports except Lyon, Sioux, Plymouth, Cherokee, and Decatur.

FOUR COUNTY SOIL ASSOCIATIONS

Three four-county soil-conservation educational programs have been carried on in the southern part of the area. These intensified programs were planned by county committees and were carried out with the assistance of an extension soil specialist assigned to the area.

Dates of operation and counties involved were:

1930–33: Appanoose, Monroe,[1] Wapello,[1] Mahaska [1]

1931–34: Decatur, Wayne, Lucas, Marion [1]

1940–42: Taylor, Adams, Clarke, Ringgold, Adair, Union

The salary of the specialist was paid by the extension service while expenses were borne by local county farm bureaus and contributing individuals.

The educational work carried on included establishing demonstrations (soil fertility plots, waterway, gully control, tree planting, contouring, terracing, etc.), conducting tours, holding meetings and carrying out activities concerned with an educational program of this type.

CCC camps

CCC camps doing erosion-control work were established in 1933 and continued until 1942. Soil-improvement associations were established within the county before the camp was moved in. These associations, which were incorporated, determined policy of the program, assisted in locating work, rented lime-rock quarries and rock-crushing equipment, determined limestone charge to cooperators who obtained lime, and in general guided the program as far as local arrangements were concerned.

Educational work was coordinated with the county extension education program. Technical plans and direction of work upon the farms were under the supervision of first the Forest Service and later the Soil Conservation Service which was organized in 1935.

Erosion-control work on public lands was done by CCC camps under the direction of the Park Service, United States Department of Interior.

Work on farms was largely gully-control work, particularly in the early years. Materials available in the community were used and in only a few areas were concrete structures built. Hundreds of thousands of black-locust trees were planted in gullies.

Later on permission was obtained to use CCC labor in crushing limestone. The program took on a larger scope and fence changing and terrace construction came into the picture. As this more comprehensive soil-conservation work was carried on, the area per farm covered was 40 acres. Later this was enlarged to include the entire farm.

The droughts of 1934 and 1936 killed many trees. Much of the early "gully plugging" work proved ineffective without soil and water control on the upland. One of the greatest values which came out of this work was that people became more aware of their erosion problems.

Counties in the basin having CCC camps at various times were: Cherokee, Woodbury, Monona, Crawford, Harrison, Audubon, East Pottawattamie, Mills, Montgomery, Fremont, Page (2), Taylor, Decatur, Wayne, and Lucas.

Watershed demonstrations

Three large watershed demonstrations were located within the area under the direction of the Soil Erosion Service which later became the Soil Conservation Service. Some of these were started in 1933.

The first area took in part of Decatur and Ringgold Counties with the main portion extending into Missouri. This was known at the Big Creek watershed demonstration. The second area included the Tarkio River from Tarkio, Mo., up through Page and Montgomery Counties. The third area was a much smaller one in Adair County, known as the Grand River watershed demonstrations.

The purpose of these large-scale projects was to demonstrate the use and value of a soil-conservation program not only to the individual farmer and neighborhood but to an entire watershed area. WPA, CCC, and NYA labor was used to do some of the work on farms such as terracing, fence rearrangement, gully control, lime crushing, etc. Limestone, fertilizer, trees and grass and legume seed were furnished to some extent by the Government as an aid in starting the program.

All technical work was under the direction of the Soil Conservation Service. Experiment station and extension service personnel aided in drafting the original technical recommendations and in carrying on the educational program.

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[1] Counties not in Missouri River watershed.

Soil-conservation districts

A "soil-conservation district" law permitting landowners to organize soil-conservation districts was passed by the Iowa General Assembly in 1939. The first country-wide but second district in the State was organized in 1940 in Montgomery County. Since then all countries in the basin have been organized except Lyon and Osceola Counties. Lyon is circulating petitions, and Osceola is developing an educational program headed toward petitioning in the fall of 1949.

Soil-conservation districts are under the direction of three commissioners elected by the landowners for 6-year terms. One of them acts as chairman, with the county extension director acting as secretary in most districts.

General policies and procedures for work within the district are developed by the commissioners. All agencies—county, State, and Federal—and groups and organizations who in any way can make a contribution to the soil-conservation program are urged to do so. It is basically recognized, of course, that the main responsibility of getting the job done on the land is that of the operators of the farms.

Commissioners and county extension program-planning committees are urged to cooperate closely in the development and carrying out of the educational activities. Suggested procedures have been developed for their guidance. The educational program is largely carried by the Extension Service, the vocational-agriculture departments, and the public schools. The Soil Conservation Service carries on farm-conservation planning and application assistance. Production and Marketing Administration makes incentive payments for soil-conservation practices.

In most districts, farmers are urged to work together in neighborhood groups for more efficient planning and adoption of practices, many of which are of mutual benefit. Such cooperation is developing greater understanding, on the part of landowners and operators, of the job to be done and of the necessity of neighborhood communities and counties working together in a concentrated effort to better the soil-conservation program of the State.

Little Sioux flood-control program

Soil erosion in many places in western Iowa has gone beyond the control of individual farmers and even counties and soil-conservation districts. To give added assistance to the present program, assistance has been provided by the United States Department of Agriculture through the Soil Conservation Service to the area within the Little Sioux area. This area begins in northwestern Harrison County and extends within a few counties in southern Minnesota. Most of the present activities are being carried on in Monona, Woodbury, Ida, and Cherokee Counties.

The added assistance under this program is the construction of necessary structures and other measures to control gullies. Priority is given by commissioners to small watersheds wherein at least 70 percent of the land is under farmer-district agreement and a good share of the necessary soil-conservation practices have been applied to the land.

Technical planning of gully-control work and construction is under the direction of the Soil Conservation Service, with the latter work being done by private contractors. Flood-control work in the Department of Agriculture through the Soil Conservation Service is conducted through soil-conservation districts the same as other phases of Soil Conservation Service operations. Projects are under way in each of the four counties, with additional ones being planned for future construction.

The cost of measures adopted to retard waterflow and reduce erosion as an aid to flood control are justified on the basis of benefits to the land treated plus benefits further down stream.

Other river areas such as the Nishnabotno area in southern Iowa are organizing themselves and are asking for similar assistance within their watersheds.

ACTIVITIES OF THE IOWA AGRICULTURAL EXPERIMENT STATION AND THE USDA CONTRIBUTING TO SOIL CONSERVATION

Soil survey

The soil-survey program of the experiment station cooperating with USDA has been under way for over 30 years. The first published reports were for Sioux and Pottawattamie Counties in 1918. (See map No. 4.)

With recent advances in soil classification, many of these published reports are out of date with respect to modern usage of soil information. Reports, such as

those for Harrison, Woodbury, and Pottawattamie Counties, have little value except to delineate the drainage pattern, roads, buildings, etc.; whereas reports such as for Osceola County and others are of considerable value when interpreted with present-day information.

The survey for Taylor and Lucas Counties has been recently completed, but the reports have not as yet been published. These counties were the first to include slope and degree of erosion in addition to soil-type information. The survey is now in progress in Monona County.

In all of the counties which have soil-conservation districts, farm planning soil-conservation surveys, which are made in preparation for farm planning, are being made by the Soil Conservation Service with Iowa Experiment Station participation in the classification of the soils and development of mapping legends.

Outlying field experiments, 1916–38

These experimental fields were cooperative with individual farmers. Fifteen counties in the Missouri Basin had outlying experimental fields. Many of the fields were established following the completion of the soil-survey reports. They attempted to determine the value of lime, fertilizer, manure, and crop residues in a crop rotation on the particular soil studied. Although these fields did not have replicated treatments and rendomized plots, yet a good deal of information concerning management of the soils was obtained. They also had considerable demontrational value.

Experimental farms

Two experimental farms are presently in operation in the Missouri River Basin—the Page County soil-conservation experimental farm located in the Marshall soil-association area and the western Iowa experimental farm in Monona County, located in the Monona-Ida-Hamburg soil-association area.

The Page County soil-conservation experimental farm was one of eight field projects in the United States established to make field and laboratory studies of methods for the control of erosion and conservation of moisture. This 200-acre farm has been in continuous operation since 1931. During the years experiments have been conducted, including the effect of cropping systems on soil and water losses, the effect of supporting erosion-control practices on soil and water losses and crop yields, terrace spacing, tillage, crop rotations, fertility studies, forage varieties, small grain varieties, and many others. In 1946 a grazing experiment was initiated. One of the primary objectives was to find a market for grass which would provide satisfactory financial returns through cattle feeding. Comparisons are made with choice Hereford steers on (1) dry-lot feeding, (2) self-fed on pasture, (3) continuous grazing and finished in dry lot, (4) rotation grazing and finished in dry lot.

The western Iowa experimental farm of 240 acres was secured in 1946 with the experimental program beginning in 1947. Many experiments similar to those on the Page County farm were established to obtain answers on the Monona and Ida soils.

These experimental farms have supplied invaluable information for the extension program in land use and conservation. Each year field days are conducted that farmers and farm leaders might see and hear about the results obtained. Agronomy mimeographed reports have been published summarizing the data for each year (Agronomy 23, 40, 88, 98).

Two additional farms in the basin area were recently leased to the Iowa Agricultural Experiment Station by groups of farmers in the respective areas. These are located in Wayne and Ringgold Counties. Experimental work will begin in 1949.

Short-time experimental work

The pase several years numerous experiments have been conducted on farmers' fields. These include soil-fertility studies, tillage studies, contouring studies, and others which also contribute greatly to the extension program in land use and conservation.

County extension programs in the Missouri Basin, 1948–49

In Iowa, each county has a county extension program development committee. It usually consists of from six to nine members—farm men and women who are selected because of their broad interest in educational work. These committees have two major functions: First, mapping the annual educational program; and second, studying the effectiveness of the educational program and making suggestions for changes throughout the year as the occasion may demand.

A number of special committees work with the county committee. The number and scope varies from county to county, but in most counties committees deal with soil conservation, family living, youth, livestock production, and so forth.

The county program-development committee, on the basis of its own discussions and the reports received from special committees working with it, prepares the program of work for the year. It is then put into operation by paid personnel and leaders, after it has been approved by the county farm bureau board.

A State advisory committee of 18 farm men and women is also a part of the program-development procedure. This committee meets at Iowa State College twice a year with representatives of the administrative, supervisory, specialist and field-agent staffs. This entire group is called the State program board.

The county extension programs in the Missouri Basin for 1948–49 have been summarized by the three areas as follows:

Area 1. Lyon, Osceola, Dickinson, Sioux, O'Brien, Clay, Plymouth, Cherokee, and Sac Counties: All counties have listed a large number of activities in the field of land use and conservation. All of them carry activities of an educational nature dealing with the importance of establishing supporting practice in order to control the loss of soil and to conserve moisture. In most counties they list contour farming, strip cropping, diversion dikes, levees, grassed waterways, and so forth. Programs to encourage better land use through improved crop rotations and efficient use of commercial fertilizers are included. Emphasis is being placed on soil testing to determine fertilizer and lime needs.

Lyon and Osceola do not have soil-conservation districts. However, both counties have indicated intentions to organize districts.

The county programs call attention to the importance of coordinating the extension educational program with other groups and agencies within the county to stimulate an interest among farm and city people in the importance of proper land use.

In two counties soil conservation was included in the 4–H Club program.

In Cherokee County an assistant county extension director in soil conservation has been employed for 2 years. This county is one of the very active counties in the Little Sioux gully-control project.

Area 2: Woodbury, Ida, Monona, Crawford, Harrison, Shelby, Audubon, West Pottawattamie, East Pottawattamie, Cass, Mills, Montgomery, Fremont, and Page Counties: County extension programs in this area have for 15 or more years placed special emphasis on soil conservation in their educational program. In this area soil-conservation districts were established shortly after the enabling act was passed in 1939.

Continued emphasis is being given to the supporting erosion-control practices such as contouring, terracing, and grassed waterways.

All counties in this area have plans for carrying on a very active program in soil conservation in the 1948–49 year. Nearly all counties are now emphasizing the importance of crop rotations, the use of fertilizers, the importance of soil testing for wise, efficient use of lime and commercial fertilizers and especially the importance of bringing all groups working with farm people into an active program in land use and conservation.

Several counties place emphasis on soil-conservation education through the school system, 4–H Clubs and women's activities in the Farm Bureaus.

In Woodbury, Ida, and Monona extensive activities in gully-control work is being carried on through the Little Sioux watershed program. These counties are on the lower end of the Little Sioux River.

In Monona County the Extension Service has an assistant county Extension director in soil conservation. Here a detailed educational program in soil conservation was outlined and is being carried out.

Area 3. (Adair, Adams, Union, Clarke, Lucas, Taylor, Ringgold, Decatur, Wayne, and Appanoose Counties): Recognizing those problems, the program-planning committees have listed for major emphasis in the 1948–49 educational program the following:

1. Increased emphasis on supporting erosion-control practice such as contouring, terracing, grassed waterways, and gully control.
2. Greater attention on programs on soil testing for efficient use of lime and fertilizer.
3. Pasture improvement and management.
4. Crop rotations.

SUMMARY OF SITUATION AND NEEDS

Area I

The per farm income in this northwest Iowa area is considerably above the State avarage. Similarly, investment in lands, buildings, machinery, equipment, and livestock is also above the State average.

This area has the lowest rainfall in Iowa. The nature of the soils has not made the erosion problem as serious as in areas II and III. Nevertheless, moisture conservation is important from the standpoint of maximizing crop production, and if practiced will reduce erosion losses. Much larger acreages of intertilled crops should be contoured, contour-listed, and terraced to accomplish this.

To maximize crop yields and production, a shift in the cropping pattern is necessary from the high acreages of intertilled crops to more grass-legumes in the rotation. Presently, only about 16 peocent of the cultivated land is in sod crops. This should be increased at least to 25 percent of the cultivated land, with intertilled crops reduced accordingly. This shift could be made with little effect on the organization of the farm in the area.

Area II

Intense rains on the rolling loess derived soils have caused erosion problems to the upland farmers and flooding problems to the bottom-land farmer. This area experences greater drouth and insect troubles.

Upland of Area II

The belt of light-colored and light-textured soils adjacent to the Missouri bottom land called Monoma-Ida-Hamburg soils have a very serious erosion problem. Huge gullies, which develop very rapidly, no only hamper farming operations but cause enormous public damage to roads, bridges, etc. Fertility problems are severe on the Ida, it being very low in available phosphorus and low in nitrogen. Many of the farms in this area are too small to be economic units.

The less steep Marshall soils lie east of the Monona, Ida, and Hamburg area (Shelby, East Pottawattamie, Cass, Audubon, Montgomery, Page, and east parts of Fremont, and Mills and Crawford Counties). Sheet erosion is quite a serious problem, particularly with high acreages of intertilled crops. An increase in sod crops with a decrease in intertilled crops is necessary to maintain productivity.

For the upland area, as a whole, water management is a real problem, not only to reduce erosion to a minimum but for the Ida and Monona soils to maintain a moisture supply sufficient for the best growth of meadow combinations, which are needed for erosion control and fertility maintenance. Contour-listing and terracing as supporting erosion-control practices are needed on many thousands more acres. A shift from the high intertilled acreage to more sod crops is also necessary to maintain fertility and help reduce erosion.

Bottom Land of Area II

Surface drainage in a large part is inadequate. Silting of drainage ditches by soil eroding from the adjacent upland section is another serious problem. Reduction of water runoff from the hill land would be directly beneficial to the bottom-land farmer.

Local people recognize the drainage problem in three categories; (1) levee breaks on the main-stem drainage way, (2) lack of adequate means of removing surface water, and (3) Missouri River high floods.

The Missouri bottom-land farmers are troubled by the usual problems of a one-crop farming system. Livestock production does not fit as well on these flat, often poorly drained farms.

An increase of legumes in the rotation on the bottom land can improve fertility and drainage and thereby increase the yields of other crops in the rotation.

Area III

These counties are a part of the southern Iowa pasture area. Here a relatively much higher percentage of the land is in sod crops. Land-use figures indicate a much more desirable ratio of intertilled and sod crops. Actually, much of the sod acreages are of a more or less permanent nature, and as a result the intertilled areas are cropped too intensively.

Soil erosion is more serious in the area because of thin topsoil and relatively unproductive and unresponsive subsoil. Severe erosion on many soils here has made necessary a reclamation program.

Drought and insect hazards are high in this area. Present farm-management practices combined with low resources per farm unit provides a low level ol income.

There is a need lor increasing the technology in crop and livestock production. Expanding the size of the hog enterprise, improving pasture for dairy, more know-how in poultry and quality in beef and sheep production are some of the needs. More mechanization will not improve income unless size of the unit is expanded. There is already an excess of labor in the area.

Drainage problems are relatively of minor importance and consist of some bottom-land drainage and side-hill seepage.

Section III: The Iowa State College Cooperative Agricultural Extension Program in the Missouri Basin

It is the purpose of the Extension Service to help people to determine accurately their own problems, to help them acquire knowledge and to motivate them to action. But it must be their own action out of their own knowledge and convictions.

The long-time broad objectives in land use and conservation of the Cooperative Agricultural Extension Service in Iowa have been outlined as follows:

1. To assist farm families in obtaining a better understanding of the soil; its use and conservation.
2. To assist farm families in understanding the causes that are bringing about depletion of Iowa's soil resources.
3. To assist farm families in adopting recommended practices and methods of soil and water management which can help bring about a permanent farming system.
4. To assist farm families in understanding how eroded and poorly drained land which has potential economical value can be rehabilitated.

The objectives to be accomplished by—

(*a*) Strengthening the extension educational program (State and county) in land use and conservation.

(*b*) Offering an aggressive educational program in land use and conservation which would enlist the cooperation and support of all agencies, organizations, and groups interested in better rural living.

The Army engineers and the Bureau of Reclamation in the Missouri River Basing place special emphasis on the control and use of water for (1) flood control, (2) irrigation, (3) navigation, (4) electric power. In the development of this major emphasis has been focused on the chief tributaries and the upper part of the main stem of the river.

To reduce the hazards of floods and reduce soil erosion losses and its resultant siltation, it is necessary to consider the control of the water when and where it falls. It is recognized also that a large number of factors contribute to the reduction of soil and water runoff. Some of these factors are—

1. Crop rotation including a grass-legume combination adapted to soil needs.
2. Conservation of manure and crop residues.
3. Reforestation and wise timber management.
4. Supporting erosion control practices—contouring, strip cropping, terracing, grassed waterways.
5. Gully control.

Contributing to the effectiveness of these factors are (1) the efficient use of commercial fertilizer, and (2) the use of lime on acid soils for good growth of legumes.

This is in effect a program in wise land use and conservation.

In order to carry out this program, an intensification of the present extension educational program of land use and conservation is necessary. By its close association with the State Experiment Station and the United States Department of Agriculture, the Cooperative Agricultural Extension Service through its extension specialists, county extension workers, allied closely with local farm people in program development—is in an excellent position to give increased emphasis on land use and conservation in the Missouri River Basin area in Iowa.

RECOMMENDATIONS

The Iowa Agricultural Extension Service should intensify the educational program by—

1. Informing all people of the scope and intent of the Missouri River Basin program with its possible effect on their social and economic welfare.
2. Accelerating the program in land use and soil and water conservation to acquaint farm people with its necessity and the techniques needed.
3. Assisting farmers to adjust their livestock, machinery, buildings, and labor to a cropping pattern consistent with good land use.
4. Assisting farmers with problems of drainage and with management of lands protected by levees.
5. Teaching principles of farm and home planning and management to enable farm families to achieve their goal of better living.
6. Teaching farm families efficient and effective use of electrical energy when more electrical energy becomes available from the basin projects.

Specific contribution by extension personnel—

1. Organize and carry out an educational program for all farm families which will develop their understanding of the basin program and lead to the selection, adoption, and application of new techniques and of farm and home management practices.
2. Encourage local groups (community, neighborhood, watershed, school district, township, etc.) to accept active participation and responsibility through which an understanding of the basin program and changes in farm and home practices might be effected.
3. Prepare and present subject matter materials such as bulletins, pamphlets, leaflets, etc., necessary in the development of the educational program.
4. Develop and prepare for distribution to professional field workers and local leaders teaching aids and devices such as charts, slides, graphs, films, models, pictures, etc., which will contribute to the general effectiveness of the educational program.
5. Build public relations which would encourage the integration of programs of various agencies and organizations in carrying on related activities.
6. Provide mass media informational service which will contribute to an understanding of the basin project and accelerate the general program.

In two counties, assistant county extension directors in soil conservation are now spending full time on programs such as are outlined in this report. In these counties the program has been intensified. Similar personnel should be made available to all counties in the basin. Without this additional personnel, it will be impossible to provide the educational activities, since the present staff is already occupied on programs developed with farm people and based on existing legislation.

Thus if the recommended intensified educational program is to be carried out, it is imperative that additional extension staff members be made available to help develop and conduct it.

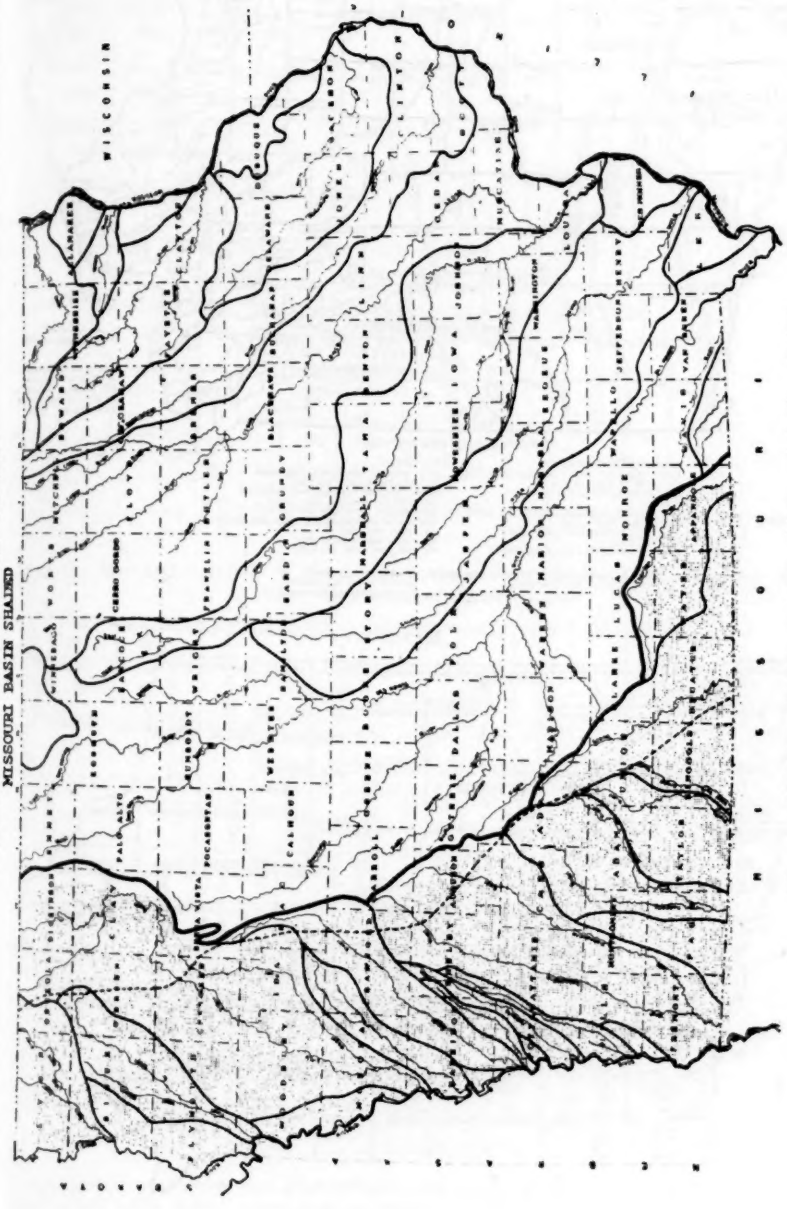
Proposed Government Programs for Developing the Missouri River Basin

FOREWORD

About one-third of the area of Iowa lies within the Missouri River Basin. Any developments that take place in the basin will have an influence on the people who live in this area. A growing demand has developed for information that will enable people to understand the various programs that have been proposed or already put into operation in the basin.

This publication, prepared under the auspices of the committee on extension program and conservation of the Iowa Agricultural Extension Service attempts to answer some of these questions. It is one of a series of publications that deal with problems that fall within the scope of the committee's activities.

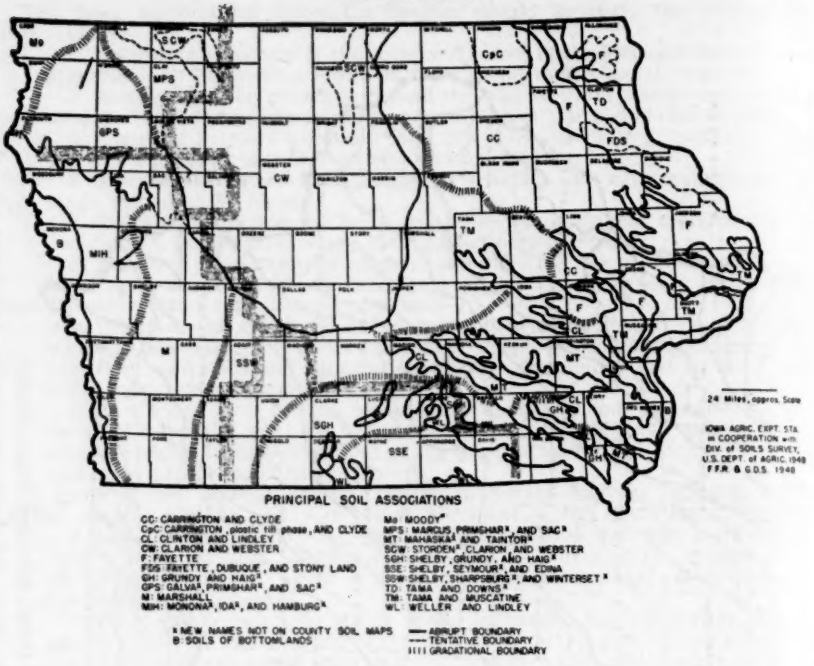
In the period since the Tennessee Valley Authority was established and began the development of that area, people have been studying the situation in the Missouri River Basin and saying that attention should be paid to the development of the resources of this area, too. The Corps of Engineers (sometimes called the Army engineers) has been doing some flood-control work on the lower portions of the Missouri Basin. The Bureau of Reclamation has been developing irrigation on the upper parts of the basin. Other agencies such as the United States Department of Agriculture have been carrying out educational programs and other projects in the Missouri River Basin.



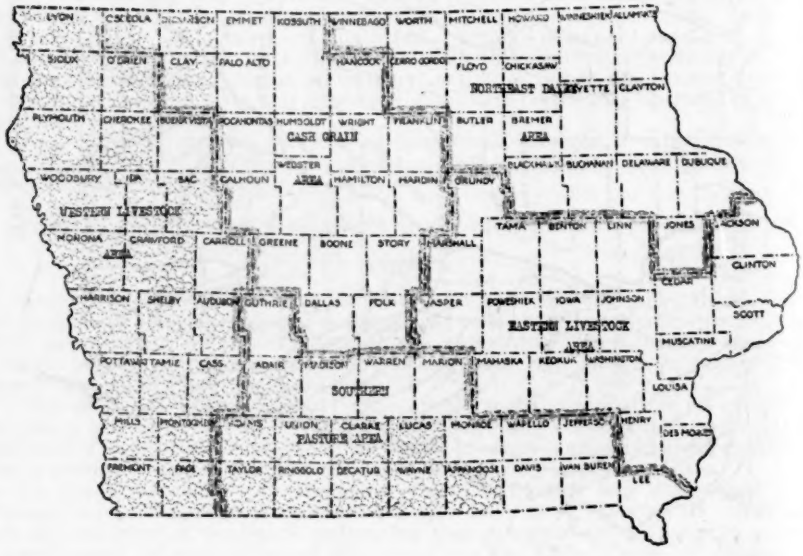
MAP 1.—*Drainage basins of Iowa; Missouri Basin shaded*

Sketch map of Iowa showing outlines of the drainage basins of the State; also the divergence between the height of land as shown by a dash line and the Mississippi-Missouri River divide as shown by a solid heavy line. (Source: Annual Report Iowa Geological Survey, 1928, pp. 35, fig. 5.)

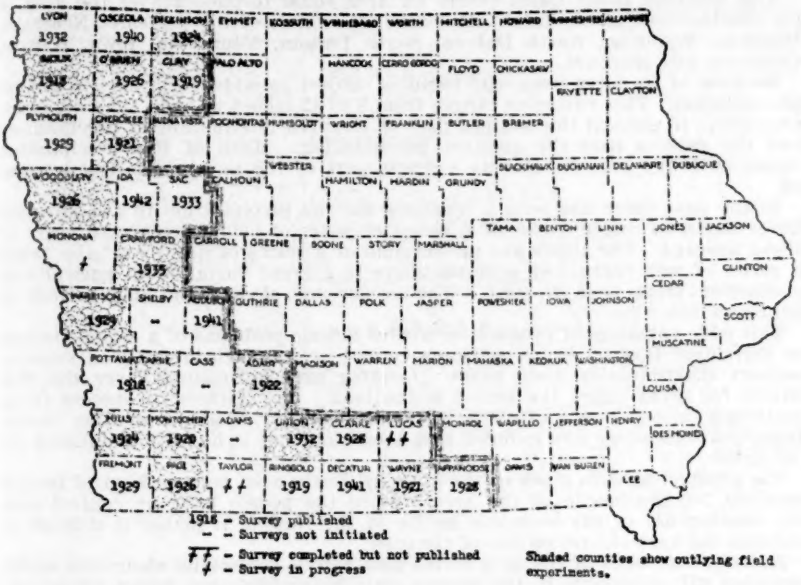
MAP 2.—*Showing three areas in Missouri River Basin principal soil association areas in Iowa*



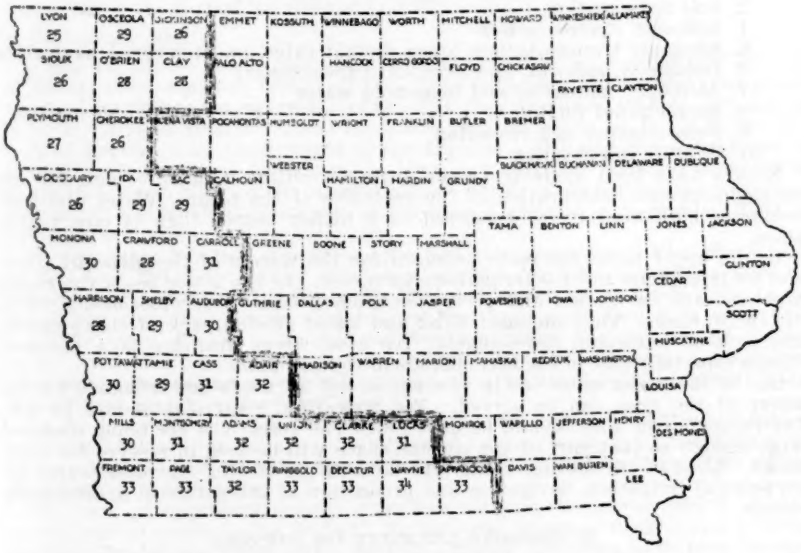
MAP 3



MAP 4.—*Missouri River Basin counties in Iowa showing outlying field experiments 1916–38 progress of soil survey*



MAP 5.—*Annual rainfall in Missouri Basin area. (Source: Climate and Man. 1941. Yearbook of Agriculture)*



Congress approved the Pick-Sloan plan under which the resources of the basin are now being developed in 1944. This plan or others may have far-reaching effects and people of the basin should know about them.

This pamphlet is an attempt to present the problems of the area and the proposed plans to deal with these problems.

I. THE AREA AND ITS PROBLEMS[1]

The Missouri River Basin covers an area equal to one-sixth of the area of the continental United States. It covers all or part of the States of Nebraska, Montana, Wyoming, North Dakota, South Dakota, Minnesota, Iowa, Kansas, Colorado, and Missouri.

Because of its large area, the basin is subject to wide variations in annual precipitation. This variation ranges from 8 to 12 inches to more than 40 inches annually. In general the western part of the area has the lowest precipitation and the eastern part the greatest precipitation. Much of this precipitation comes as heavy showers and as a result part of the moisture is lost by run-off.

In the past there has been a tendency for the precipitation in the Missouri River Basin to run in cycles of a series of years of below average to years of above average. The 1930's are an example of a series of dry years; the 1940's a series of wet years. As a result there is a great variation in agricultural production from year to year. The occurrence of wet and dry periods is unpredictable.

This wide variation of production creates income problems of a serious nature on individual farms. Many operators cannot save enough in the good years to support themselves in poor years. Lending agencies cannot carry the risk either, for many times the period is too long. The chances of success for a beginning farmer with limited capital depend largely upon the weather cycles. Improved technology has reduced risk somewhat, but it has not eliminated all the risks.

The greatest need in much of the Missouri Basin area is some kind of income stability for the people of the area. Since the people have no control over the weather nor of the economic health of the Nation, it makes it difficult to stabilize the agricultural income of the area.

Some of the needs of the area which man can do something about and which probably will contribute to the income stability problem and better living conditions are:

1. Flood control
2. Irrigation at reasonable costs to the farmers
3. Soil conservation
4. Low-cost electric power
5. Adequate transportation, lower freight rates, and improved navigation
6. Industrial, mineral, and phosphate development
7. Abundant industrial and household water
8. Recreational facilities
9. Reforestation and reseeding
10. Wildlife conservation

Efforts have been made in recent years to outline a definite plan for the development and conservation of the resources of the basin. Water and land resources both need to be developed to a higher degree than is now taking place.

In the upper basin the main demands for the waters of the Missouri River and its tributaries are for irrigation and power. In the lower basin the major problems are navigation and protection from floods. Several problems affect the entire basin. They include: Wind and water erosion, lack of cheap power, and lack of industrial development. In some areas drainage is a problem. This is especially true of the bottomlands in western Iowa.

One of the major questions is whether or not all needs and demands for the water of the area can be served. For irrigation, reservoirs should be full. For flood control, they should be kept low. The reservoirs are being designed large enough so that part of the storage space will be held in reserve for large floods. Most of the storage space will be used for storing adequate water for purposes of irrigation, navigation and production of current from hydroelectric plants.

II. PROPOSALS AND PLANS FOR THE AREA

There are several proposals and present plans for development of the area. Since the early part of the twentieth century the Bureau of Reclamation and the Corps of Engineers have been studying and doing some work on the Missouri River. Both have depended upon Congress to appropriate money for

[1] For more detailed information on the agriculture of Iowa see A Guide for Extension Activities in the Missouri Basin of Iowa.

projects they recommended. Appropriations for projects have continually run behind the projects recommended.

The Bureau of Reclamation confined its studies to the upper part of the river where it has had charge of irrigation and power projects for the past 40 years or more. The Corps of Engineers has had charge of flood control and navigation on the lower part of the river since 1902.

A. Pick-Sloan plan

It was inevitable that conflict would develop within the area as the Bureau of Reclamation and the Corps of Engineers expanded their respective plans. The final result was the emergence of the Pick plan developed by Maj. Gen. Lewis H. Pick, Corps of Engineers, and the Sloan plan developed by W. G. Sloan, Bureau of Reclamation, Department of the Interior. The two plans remained in conflict until they were integrated in 1944 into what is commonly referred to as the Pick-Sloan plan for the Missouri River Basin. This integration took place shortly after President Roosevelt called upon Congress in September 1944 to authorize a Missouri Valley Authority.

On December 22, 1944, Congress approved this coordinated Pick-Sloan plan (Public Law 534, 78th Cong.). The plan provides for 105 reservoirs; levees for protection of agricultural lands in the Missouri Valley below Sioux City, Iowa; levees for municipal areas; systems for distribution of irrigation water for 5 million acres of new lands, and supplemental water for another 1.5 million acres; hydroelectric plants having an eventual installed capacity of 1.6 million kilowatts of power and an annual output estimated at 10 billion kilowatt-hours of electrical energy, and related works.

In the Flood Control Acts of December 22, 1944, and July 24, 1946, Congress authorized 350 million dollars to be expended by the Corps of Engineers and 350 million dollars to be expended by the Bureau of Reclamation for partial accomplishment of the program.

The rate of appropriations by Congress will determine the length of time it will take to complete the project. To date the Missouri River Basin is being developed under the above plan. Several different proposals have been brought before Congress but none of them have been adopted as yet.

B. Missouri Valley Authority

Several bills have been introduced in Congress that would create a Missouri Valley Authority. None of these bills have been passed to date. If a Missouri

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Valley Authority is created in the future, it will supersede the present Pick-Sloan plan for development of the Missouri Basin.

The latest bill proposing the establishment of a Missouri Valley Authority was introduced in the United States Senate (S. 1160) on March 2, 1949. The stated purpose of the bill was "to establish a Missouri Valley Authority to provide for unified water control and resource development on the Missouri River, its tributaries and watershed, to prevent floods, reclaim and irrigate lands, encourage agriculture, stimulate industrial expansion, develop low-cost hydroelectric power, promote navigation, increase recreational possibilities, protect wildlife, strengthen the national defense, and for other purposes."

The Missouri Valley Authority would set up a corporation which would be an instrumentality of the United States. The corporation would be directed and controlled by a board of five directors who would be appointed by the President with the advice and consent of the Senate. Any member of the board could be removed by the President. At lease three members of the board would be required to have had a legal residence within the Missouri Valley region for a period of not less than 5 years prior to appointment.

The board would be assisted by an advisory committee which would act only in an advisory capacity.

The advisory committee would consist of the governor or his designated representative from each of the States within the Missouri Valley region as set forth in the act, and of the principal officer or his designee of the following Federal Government agencies: Departments of Interior, Agriculture, Commerce, Justice, War, Labor, Federal Power Commission, and Board of Governors of the Federal Reserve System; and 12 persons, residents of the area of the authority, three of whom shall be selected by the President to represent the interests of agriculture, three to represent the interests of industry and commerce, three to represent the interests of labor, and three to represent wildlife and aquatic life, conservation, and recreation, in the area covered by the authority and activities of the corporation.

Any plan for the Missouri River Basin developed by the Missouri Valley Authority would, so far as it is practical, use works and programs already approved by the Congress which fall within the scope of river basin development as defined by the act and for which appropriations have already been made.

It is further provided in the act that the use for navigation of water arising in States lying wholly or partly east of the ninety-eighth meridian shall be only for such use as does not conflict with any beneficial, consumptive use, present or future, of such waters for domestic, municipal, stock, water, irrigation, mining or industrial purposes in States lying wholly or partly west of the ninety-eighth meridian.

The ninety-eighth meridian passes through North Dakota, South Dakota, Nebraska, and Kansas.

The Fort Peck Dam across the Missouri River in the State of Montana, together with all its works, would be turned over to the Missouri Valley Authority.

The corporation would be required to pay to State and local taxing bodies each fiscal year a sum in total not less than the revenue lost to the States and political subdivision affected by the corporation's removal of property from the tax rolls formerly subject to State and local taxation.

Many people are opposed to such a plan because they maintain it would take away many States' rights and create a superstate.

People in favor of the Missouri Valley Authority maintain that development of a program within each State's boundaries is difficult if not impossible, and to make best use of resources, the basin must be developed on an area basis.

C. Agencies interested in the Missouri Basin

One of the first Government groups to become interested in an over-all plan for development of the Missouri River Basin was the National Resources Planning Board, from which emerged the Missouri Valley Planning Commission in 1941. This Planning Commission consisted of a delegate from each of the eight States (Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, and Montana) and a representative for each; the War, Agriculture, and Interior Departments of the Federal Government. This commission was disbanded on abolition of the National Resources Planning Board as of June 30, 1942.

The Missouri River States' Committee, organized in December 1941, is still functioning. It consists of the governor and two members from each State.

On April 26, 1945, the Federal Inter-Agency River Basin Committee established the Missouri Basin Inter-Agency Committee. This committee is composed of 1 representative of each of the 5 participating Federal agencies and 5 governors representing the 10 Missouri Basin States. (The Federal agencies represented are the Corps of Engineers, Department of Interior, Department of Agriculture, Department of Commerce, and Federal Power Commission.) Governor members of the committee are selected by the Missouri River State Committee. Inclusion of these governors on the committee gives representation to the States and assures that the viewpoint on all problems will be given fullest consideration. W. G. Sloan is now chairman of the Missouri Basin Inter-Agency Committee.

The committee performs a service in aiding the coordination of planning, construction and administration for the comprehensive basin program approved by Congress. It has provided the means through which the Federal agencies have effectively coordinated their activities among themselves and with those of the States. The Missouri Basin Inter-Agency Committee meets monthly, rotating among the basin States. At one of the 1948 meetings of the inter-Agency committee, all agencies and all 10 States approved a $2½ billion program for basin development covering the succeeding 6 years.[2] This committee serves in an advisory capacity only and does not have authority to carry out the Missouri River Basin program.

III. WHAT IS THE PICK-SLOAN PLAN?

Since the Missouri River Basin is now being developed under the Pick-Sloan plan with the Missouri Basin Inter-Agency Committee as an advisory and coordinating committee, more detailed explanation follows.

The Pick-Sloan plan proposes a system of 105 reservoirs on the Missouri and its tributaries, from the Gasconade River in the State of Missouri to Horse Prairie Creek in Montana. Altogether, the reservoirs will store 100 million acre-feet[3] of water. This is enough to irrigate 5 million acres of new land now dry and provide enough additional water for 1.5 million more acres where irrigation is hampered by inadequate water control.

The plan envisions 43 hydroelectric power plants capable of generating about 10 billion kilowatt hours of electricity a year. (For comparison, the hydroplants of Nebraska Public Power System generated a half billion kilowatt hours in 1947.)

The entire series of dams and reservoirs is designed to regulate the flow of water in the Missouri River and its tributaries for flood control and navigation. A complete levee system from Sioux City to St. Louis is included to stabilize the river's course and provide flood protection for 1.5 million acres of river-bottom farm land. There are about 1.8 million acres of land, the lower basin (below Sioux City) subject to flooding at extreme stages. A 9-foot channel for boats and barges up the Missouri as far as Sioux City is planned.

Additional benefits include new recreation areas around clear-water reservoirs and stimulated fish-and-game conservation programs in an area sadly lacking these facilities.

A. Proposed benefits to Iowa of the Pick-Sloan plan

How would Iowa benefit under the Pick-Sloan plan? The main benefits to Iowa would be electrical current, flood control, navigation to Sioux City, and pure water supplies for certain municipal areas.

Western Iowa can expect to receive some electrical current from the hydroelectric plants on the main-stem dams on the Missouri River in South Dakota. This electrical power will probably come from Fort Randall and may be available as early as 1955. The Bureau of Reclamation is trying to find potential customers who will be interested in receiving this electric power.

Under the existing law, public bodies such as municipal distributing bodies and power cooperatives receive first priority in the purchase of federally produced power. It is not certain at the present time if Iowa will receive the power at the dam site, at the western edge of the State, or at various substations. The Bureau of Reclamation will probably bring the power at least to the edge of the State.

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[2] Missouri Basin Inter-Agency Committee—Six-Year Program for Missouri River Basin as prepared by Missouri Basin Inter-Agency Committee, July 29, 1948.

[3] This amount of water would cover 100 million acres with 1 foot of water.

The Department of Interior has announced that the cost of the electrical power will be about 5 to 6 mills per kilowatt-hour, depending on several factors. This rate is applicable to wholesale power customers only. Most users will find this rate favorable enough to consider using this electrical power instead of generating it themselves.

There are about 700,000 acres of bottom land in Iowa subject to flooding by the Missouri River and its tributaries (492,353 acres of this land is along the Missouri) at extreme flood stage. About 217,000 acres of the total are readily subject to flooding (with 152,761 acres of this along the Missouri). The levee system proposed would attempt to protect most of this Iowa land from flooding. The reservoirs upstream on the main stem and on the tributaries would help to make the levees more effective, as they would be used to hold the flood stage at a controllable level. The Corps of Engineers has plans for a levee system that, along with upstream reservoir storage, would prevent any flooding from the Missouri River. This would not take care of the entire flood problem in Iowa bottom lands, since much water coming from sources other than the Missouri River floods the Iowa bottoms. The control of these waters comes under the United States Department of Agriculture's program for the area.

Western Iowa would benefit from the 9-foot channel to Sioux City which is now under construction. Water transportation might raise grain prices slightly and lower the cost of some raw materials such as fuel. Barge rates are about 80 percent of freight rates. The availability of water transportation may also tend to hold freight rates down even though the barges were never used.

Some communities in western Iowa might benefit from the Pick-Sloan plan through improvement of municipal water supplies and sewage disposal.

A cheap source of power would do much to attract industry to the Missouri Basin area. Some of these industries might be located in western Iowa.

IV. THE UNITED STATES DEPARTMENT OF AGRICULTURE PROGRAM FOR THE MISSOURI BASIN

In addition to the Pick-Sloan plan for the Missouri Basin, the United States Department of Agriculture will promote an aggressive program to develop the agricultural resources of the area. Much of this program will consist of the development and conservation of land, water, and forest resources and for flood control. It will be a long-time program covering at least 30 years. The purpose would be to achieve in that period what normally would take 100 years. Since much of the work will be educational in nature, the agricultural extension services of the area will have a large stake in the agricultural program for the Missouri Basin. It has been estimated that the agricultural program will cost the Federal Government $3 billion. The State governments would put in about one-half billion and the individual farmers about 5½ billion dollars.

The following is quoted from the report of the Missouri River Basin Agricultural Program.[4]

"The program will be accomplished, in the main, by encouraging farmers and private owners to protect their land from erosion and depletion and to operate their farms and ranches so as to withstand the punishment adverse weather inflicts on land and people. In making and applying practical conservation plans, farmers, ranchers, and landowners will have available to them the best technical assistance the Federal and State agencies can furnish.

"In addition, farmers, ranchers, and landowners will be reimbursed in part for the cost of the initial installation and application of those practices. This employment of public funds recognizes that many of the benefits are in the public interest, such as conserved resources, flood control, better water supplies, enhanced recreational opportunities, and the reduced need for public assistance in the event of adverse weather. In some instances, moreover, new installations and practices require major adjustments in farm operations and the temporary loss of farm income. For these reasons, the public should share first costs in the appropriate degree. This practice is now employed throughout the United States. Under the program proposed for the Missouri Basin, the practices would be accelerated in keeping with urgency of the problems of conservation and land use in the basin and to aid in its full-scale development.

"But the program provides still other means to establish good land management in the basin. Intensified extension education, rural electrification, and research will give their essential support to the program."

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[4] Missouri River Basin Agricultural Program, U. S. Department of Agriculture, April 1949. Revised, August 1949.

This agricultural program has five major operating phases.[5]

1. A program of conservation and improvement measures on grassland and cropland is designed to reach all of the 582,000 farmers and ranchers in the basin. The goal is the application of good land-management and conservation practices to the farm and ranch lands of the basin. This would involve adoption of improved management and land-use practices on the 113,000,000 acres of cropland in the basin and the seeding of 20,000,000 acres to grass and legumes for rotation hay and pasture. Needed also would be measures such as 1.9 million miles of terraces, grassed waterways, and other structures to retain or dispose of water. The privately owned grassland also needs improved management. This program includes reseeding of 17.5 million acres of depleted range, development of water supplies, fire guards, and fences.

2. A program for forest and forest range would cover an estimated 45 million acres, of which 22 million is in public ownership. The forests are a resource with many uses: timber, grazing, recreation and wildlife, and the protection of water supplies. This latter function is of particular importance in Federal forests, which are the sources of a substantial share of the water available for irrigation. The program is designed to improve forests and ranges by applying better management, fire protection, planting, and many other improvements. On privately owned land the program would be carried out by furnishing technical assistance and financial aid to private owners.

3. A program of stabilizing measures for small watercourses has been proposed to assure safe disposal of water in small watersheds and the lesser tributary streams. This will reinforce land-conservation measures, contribute to flood control and to the protection of lands being destroyed by major gullies, bank cutting, and sedimentation. The program contemplates the construction of measures which generally affect more than one farm. These would include gulley control structures, floodways, bank-protection works, small retarding basins, and others.

4. The program for irrigation involves (*a*) educational, technical, credit, and financial assistance to rehabilitate and improve the use of land and water on existing irrigation projects, (*b*) factual data and technical advice in areas for which new irrigation is planned; and (*c*) assistance and services to farmers in developing land improvements and systems of farming under new irrigation.

5. The drainage program for the Missouri Basin is planned for an estimated 5.8 million acres now in drainage districts or needing additional drainage. It is estimated that half of this acreage needs some degree of improvement or rehabilitation. The Department will assist farmers in rehabilitating drainage systems and in constructing new systems. It will also help individual farmers with their drainage problems.

This agricultural program for the Missouri River Basin was transmitted to Congress by the Secretary of Agriculture on September 29, 1949, and was referred to the Agricultural Committee of the House of Representatives for consideration. It will be necessary to receive additional funds from Congress if this comprehensive program is to be completed in the estimated 30 years.

The agricultural program for the Missouri River Basin is a proposed program at the present stage. To date no action has been taken on it.

V. COST OF PROPOSED PROGRAMS FOR THE MISSOURI BASIN

What will the Missouri Basin development program cost? Some of this cost would be covered by incomes from the hydroelectric plants and the irrigation systems. At the present time it is difficult to estimate how much the irrigation systems would return. The Bureau of Reclamation has estimated that the plan would have a favorable cost return ratio, but it figured the increase in crop production as the return rather than the irrigation payments. The irrigation payments would be the only return to the Federal Government, while the increase in crop production over the cost of irrigation payments would go to the farmers.

Part of the area designated for irrigation would not need water every year. This is especially true of the eastern parts of Nebraska and North and South Dakota. Normally this area would need water for irrigation only about 3 to 6 years out of 10. This will mean that the returns to the irrigation system will

[5] Steele, Harry A., The Missouri River Development Program, Journal of Farm Economics, vol. 31, No. 4, pt. 2, pp. 1010–1016. November 1949.

be changeable or else the farmers will have a high irrigation cost for the number of years they will need it. As yet it is not known how many farmers in this area will sign up for irrigation water; and, until they know what the costs will be, farmers will be reluctant to sign agreements for water. If only part of the farmers of an area want irrigation water, the distribution cost per farm goes up. The Bureau of Reclamation has indicated that sale of electrical power may help support some of the irrigation costs. "In general, the revenue from the sale of power and energy must be sufficient to cover annual expenses, including operation and maintenance of the power system, provision for replacement of power facilities, 3 percent interest on all power facility expenditures, and that cost of irrigation facilities that is over and above the ability of water users to pay."[6]

Present laws allow no one person water for more than 160 acres of irrigated land. The average size of farm in some areas is larger than this, which would necessitate an increase in number of farms for the area when irrigation comes or else only part of the land will receive irrigation.

The cost to the Federal and State Governments of the Missouri Basin development has been currently estimated as follows:[7]

Corps of Engineers	$2,019,000,000
Department of Interior	3,024,000,000
Department of Agriculture	3,092,000,000
Other Federal (6 years)	20,000,000
State government (6 years)	100,000,000
Total	8,255,000,000

The development period is usually thought of as extending over a term of years. If 30 years is used as in the agricultural program, the annual rate of expenditures would be about $275 million for Federal funds. In the fiscal year 1949 the Corps of Engineers received $92 million for the basin, and the Department of the Interior, $87 million, or a total of $179 million. The Department of Agriculture made expenditures for the type of work covered in its program from its regular or national funds of about $24 million in the Missouri Basin but received no special appropriation in 1949 for work in this area. From these rough calculations it is apparent that a considerable acceleration of the agricultural program is needed to put it on a schedule that will be comparable to the other phases.

The Bureau of Reclamation and the Corps of Engineers have initiated work on about 40 percent of the combined over-all programs for these two agencies. However, the total appropriations to date amount to only about 17 percent of the total cost of these programs.

VI. MISSOURI BASIN PROGRAM IN IOWA AND IOWA STATE COLLEGE AGRICULTURAL EXTENSION SERVICE[8]

A broad educational program will be an essential factor in the program of development and conservation of the agricultural resources of the Missouri Basin.

Its objectives should be to assist all the people in the area to understand the purposes of the flood control, power development, soil and water conservation, and water resources program.

In Iowa the principal interest is in the 30 counties within the basin, all of which are subject to erosion, most of them rather severely. Many have a definite need for moisture conservation. In addition there are three-fourths of a million acres of land along the Missouri River that will be affected by the levees which are placed on the main stem. Problems of drainage are bound to result from this construction.

There is a general lack of public understanding and appreciation of the possibilities in the development of the Missouri River Basin. There is also lack of appreciation of the many adjustments in farming that must come about in order to protect the new public investments in dams, reservoirs, and other construction work. There also is a great need to develop and expand participa-

[6] Letter from Bureau of Reclamation, U. S. Department of Interior, regional office, region 7, Denver, Colo., June 22, 1950.

[7] Steele, Harry A., The Missouri River Development Programs, Journal of Farm Economics, vol. 31, No. 4, pt. 2, pp. 1010–1016. November 1949.

[8] Statement prepared by Vincent M. Anderson, district extension supervisor, Ames, Iowa, July 1949.

tion of farmers and civic leaders in the planning for and in development of the program.

The Extension Service has a major responsibility to assist farm people to understand and adopt a wide range of new techniques of soil and water conservation. Some specific problems in Iowa are (1) adoption of practices and systems of farming to reduce erosion of soil; (2) the conservation of moisture, especially in the western and extreme northwest counties; (3) reduction of the rate of siltation in stream and drainage systems; (4) the readjustment of farming programs and the marketing system that will result from major changes in farming systems that it will be necessary to make in order to control erosion, retard water runoff, and to provide proper drainage.

To contribute to the solution of these and many similar problems, the following suggestions are made: (1) A general educational program to inform all persons in the 30 counties in the Missouri Basin in Iowa of the program. (This is a major responsibility of the Extension Service.) (2) A general soil and water conservation program over and above the regular program to keep all people acquainted with the necessary changes and the farming techniques required to maintain the productivity of the land and to reduce soil loss and prevent siltation and to reduce floods. (An intensive educational program is necessary as to the effect of soil and water conservation, crop and livestock management, silt reduction, soil fertility, and stabilizing the fluctuations in agricultural production that arise from droughts and floods.) (3) A special program that will assist farmers to adjust their livestock enterprise to the change in cropping patterns in those areas where major changes are made necessary in order to conserve the productivity of the land. (Less corn and much more hay and pasture will result, and definite changes in operations will need to be made.) (4) A similar educational program that will assist in the problem of drainage and the problem of management of the three-fourths of a million acres of land that are to be protected by levees along the river.

To carry out the foregoing suggestions, assistance over and above that used in the regular extension program will be necessary. A full-time assistant in soil conservation is needed in each county within the basin. His major responsibility would be to do educational work in soil conservation. Also, it would be important to have a home economist in each of these counties, and emphasis should be given to the effect of the Missouri Basin program on the family and the home. This entire program should result in a greater stability for agriculture in the area. There would be need for several workers at the State level to assist in planning and in developing the program within the area and the program within each county.

It would be difficult at present to match Federal funds with local funds in order to move into this program rapidly. Therefore, it has been suggested that a special appropriation of State funds should be supplied, and the suggestion has been made that those should come in a special grant from the legislature.

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TEAMWORK TOWARD BETTER LAND USE AND SOIL CONSERVATION IN WESTERN IOWA

Foreword

Iowa's soil resources are our richest natural asset. Our soils constitute important foundations of the State's economy and contribute materially to the Nation's prosperity and well-being. The maintenance of our soils in a high state of productivity is essential to the continuing well-being of our State and Nation. The job of maintaining our soils is not an easy one. Fine starts have been made. But the job ahead is as tremendous as it is important. It calls for reliable information to be used by farmers, both farm operators and farm owners, throughout the State.

Studies to discover this information and educational work to get it to farmers require the help of many specialists in soils, economics, crops, livestock, forestry, feeding, agricultural engineering, sociology and political science. The job ahead also calls for cooperation between local, State and Federal agencies sharing the responsibility of finding and encouraging better land use practices. In short, the job ahead demands teamwork with many members on the team.

This report is a result of teamwork among Iowa State College research and extension specialists, representing several departments in the division of agriculture and representatives of United States Department of Agriculture agencies working together toward a common goal—more satisfaction from rural living, which cannot be achieved without good land use and soil conservation.

Although this report focuses attention upon the land use problems of a soils area in western Iowa, much of the reasoning and method of analysis is applicable to similar problems throughout the State. Thus, the material contained in this report should not be limited in usefulness to the Ida-Monona soils area but could well serve as a basis for study and discussions of better land use in other sections of the State.

Another result in the preparation of this report must not be overlooked. In the process, a well-rounded team of land-use workers has been formed. Each member has become acquainted with the contributions expected and needed from other members of the team. Through this technique of working together, our research and educational specialists can serve better the needs of the people of Iowa.

Floyd Andre,
Dean and Director of Agriculture.

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I. SUMMARY

Iowa's soil resources are being depleted at a rapid rate. At the present time efforts aimed at stopping this depletion are inadequate. In an attempt to meet the problems of land conservation additional programs are being started. One of the major undertakings is the Missouri River Basin development.

To help lay the groundwork for the development of a long-range policy for the best use and conservation of the State's land resources, representatives of Iowa State College and cooperating agencies made an intensive study of the situation during 1948 and 1949.

This study was initiated by the State soil conservation advisory committee. Taking part in it were representatives of the Iowa State College agricultural extension service and agricultural experiment station; and the Bureau of Agricultural Economics, the Soil Conservation Service, the Forest Service, and the Bureau of Plant Industry, Soils, and Agricultural Engineering of the United States Department of Agriculture.

To help avoid excessive generalization, the study was focused on land use and soil conservation in the Ida-Monona soil area in western Iowa and the adjacent Missouri River bottom land. This area was selected because it has severe erosion problems on the upland areas and drainage problems on the bottom land.

As a guide to its discussions the group developed this concept of soil conservation: "Since the function of land is to serve the wants of people, the objective of land use is to maximize the products and services yielded by land in response to human effort in the form of labor, management, and capital." Thus, the purpose of conservation is not just the preservation of the land; it is to use it in such a way that people will enjoy sufficient and continuous supplies of food, fiber, and services which come from the land.

Planning for conservation requires continual reappraisal of objectives. Consideration must be given to growth and composition of population and to changes in demand for products of the land including foreign demand, new or improved technology related to land use and farming methods and productivity of the land. Thought also must be given to keeping land in shape to meet a national emergency and to care for long-term consumption needs. Our soils must be kept as a stockpile of productivity of the essential products derived from land.

Before programs of land use and conservation can go forward it is necessary to consider many factors. The level of productivity to be used as a goal must be set. Information must become available to show how far in any particular year or period of years this level of productivity may be departed from without doing irreparable damage to the soil. It is necessary to know the practices and systems that may be used to reach the productivity goal. Consideration must be given to the educational and operational programs best suited to reaching the objectives. The amount of public funds to spend and conditions under which these funds should be spent on private land need careful study.

This report brings together the answers to some of these questions, as far as present information permits. It also suggests fields in which further investigation and research are needed in order to answer equally important questions.

The Ida-Monona area and the adjacent Missouri River bottom land run through parts of nine counties in western Iowa. This area, whose name (Ida-Monona) is taken from the main soils found in it, occupies a belt of hilly and steep land bordering the Missouri River bottoms. It contains about 1 million acres, or about 1 percent of the cropland area of the Corn Belt. Adjacent bottom land has an area about one-fifth as large.

Agriculture in the area centers around the production of products of high value, mainly meat animals. Corn is exported from the area, especially from the bottom lands.

Soil erosion is a serious problem. Large gullies have developed on much of the upland area. Flooding of the Missouri River bottoms is a problem closely associated with the runoff from the hill land. Also, the silt which clogs the drainage ditches comes from sheet erosion and the gullies in the hills.

An intensive type of crop production is followed. About 78 percent of the area is in harvested crops—principally corn and oats. Pasture and timber occupy the remainder of the area. Timberland, which amounts to about 8 percent of the area, is usually pastured.

Both corn and oat yields have shown increases in recent years due to the introduction of improved varieties, use of fertilizer, and the adoption of other improved practices. However, many farmers do not follow a regular crop-rotation system. Grasses and legumes—because it is difficult to obtain good stands—are usually left down for several years.

Some soil-conservation practices have been adopted. But their use is not sufficiently widespread to correct the serious conditions that have developed. Drainage is a distinct problem, particularly on the bottom lands. Large sums of money have been expended, but have contributed little to the solution of the drainage problem. Drainage problems in the bottoms are closely related to land use in the hills.

Almost one-half of the farms are tenant-operated. The common Midwest problems of farm tenancy are found in this area: Short-term occupancy, lack of incentives for more stable farming systems, and the like.

Looking to the future it is apparent that both farmers and society should consider the long-run as well as short-term effects of the present farming system on the land of this area.

There is little doubt that corn production will continue to be basic to the type of agriculture best adapted to this area. All plans for land use should, therefore, provide for a high level of corn production; at the same time these plans must be directed toward a goal of holding annual average soil losses down to about 5 tons per acre, or toward a new goal that may be indicated by fuller knowledge as being in the long-run interests of both farmers and the general public.

The land-use recommendations in this report are aimed at reducing soil losses to this 5-ton objective. Consideration has been given to allowable variations from this soil loss as a result of economic conditions, new information which may become available, and rotation cycles.

It is assumed that shifts in crop production will be accompanied by the adoption of suitable agronomic and engineering practices.

It also is assumed that some public expenditures to aid in conservation will be needed and that adjustments will be made in public works programs to achieve the conservation goals.

If the recommendations of this committee are adopted, it is presumed that crop yields will increase. The proposed shifts, therefore, would not reduce the total feed output of the area. In fact, there is some evidence that feed production may be increased.

It became apparent as this study progressed that much research of basic problems must be done before final recommendations could be made for the best use of land in this area. Later sections of this report recommend that the Iowa Agricultural Experiment Station and cooperating agencies expand present research programs and initiate new ones to supply the information needed. For without sound and adequate information, farming changes to promote better land use and soil conservation cannot be undertaken with assurance of success.

II. Importance of Use and Conservation of Iowa's Land Resources

The public importance of proper land use must be recognized. Practically all of the Nation's food comes directly from the soil, and an important share of it comes from the soils of Iowa. A continuous, adequate supply of food is essential to peacetime prosperity and is the first line of defense in time of war. But a continuous, adequate supply of food is directly dependent upon how we use our soil from year to year. Since Iowa is the leading food-producing State, its citizens have a responsibility to the Nation, as well as to present and future generations of Iowa farmers, to use our soil resources wisely. Such responsibilities require us to look far into the future.

The way Iowa lands are used and their present and future condition are of tremendous concern to all Iowans. About one-third of the State's population live on farms. Another 20 percent live in small towns and villages. These people are, either directly or indirectly, almost wholly dependent upon the land for a living. The remainder of Iowa's people are dependent to various degrees upon the welfare of agriculture and the productivity of our soils.

The State soil conservation advisory committee has emphasized the need for developing a long-term soil conservation and land use program for Iowa. Behind this need is the realization that: (1) Iowa soils are a most valuable natural resource and their maintenance in a high state of productivity is vital to the well-being of the State and Nation; (2) continuous heavy cropping of the soil has resulted in reduced fertility, deterioration, and abandonment of some lands for agricultural use; (3) most land use maladjustments can be corrected privately by farm owners and operators with the aid of research and education—technical assistance and incentive payments can speed up the process; (4) in certain instances conservation is beyond the immediate control of the individual farmer, because he lacks credit, has inadequate tenure arrangements, is burdened by excessive debt and taxes, is restricted by road layout and similar circumstances; or he must contend with the effects of erosion and other problems which originate beyond the boundaries of his farm; (5) public interest may call for land use shifts, practices, and improvements beyond the point of profitability to the individual farmer—such measures may demand public assistance up to the point of public profitability; (6) all efforts to conserve soils, local, State, regional, and national, should be fully integrated toward the unified purpose of long-time land use—unfortunately, this integration has not yet been fully effected.

As the first step in developing a long-range land-use policy, the State soil conservation advisory committee recommended that a land use study be made.

Following this recommendation a study group was formed, made up of interested people at the college and various cooperating agricultural agencies. After considering several ways of studying our land-use problems, this group decided that its first year's study should be concentrated on a limited area. The Ida-Monona area in western Iowa was picked because it has serious land-use problems. Erosion and gullying have assumed serious proportions in the 60 to 70 years this area has been under cultivation. In addition, the area lies within the Missouri River basin and it will be affected by currently planned develop-

ments within this region. Much of the area also is in the Little Sioux River watershed, where an extensive program to retard water run-off and soil erosion is now underway.

The committee believed that by studying the problems of this area and by making recommendations for needed changes in land use and management, it would be taking a step toward setting a pattern for similar studies in other parts of the State.

III. What Is Good Land Use and Conservation?

Land is used by man to provide for his wants. He uses it as a source of food, fiber, shelter and services. His purpose is to get from the land the largest amount of products and services he can in return for the labor, management and capital he finds worth while to use.

When conservation practices are applied to land, the object is to get a larger amount of production over a longer period of time than would otherwise be received. Conservation is in sharp contrast to mining of the soil—of getting a maximum production in a short period, rather than operating to obtain long-time benefits. It means considering both the needs of people and the productive capacities of land.

Conservation is not and should not be considered an end in itself. Instead, conservation should be viewed as the means of providing over a period of time the food, fiber, and services which people desire and which particular lands are best capable of producing.

Land-use recommendations must consider present needs and situations as well as a look into the future.

Among factors that must be continually reappraised are: (1) population growth and location, (2) consumption habits and tastes, (3) foreign trade, (4) changing productivity of land, (5) technological developments, (6) substitution of nonland factors for land and its products, and (7) a margin of safety (which guarantees an adequate level of productivity) for national emergencies and for miscalculations of needs. Such a contingency reserve of soil productivity is a necessary counterpart of our national efforts to stockpile various kinds of strategic natural resources.

Conservation programs demand that we find answers to questions such as the following: To what extent is erosion to be controlled? What level of productivity should we strive to achieve and maintain? During any particular year or period of years, how far can this level be departed from without doing irreparable harm to the soil? What are the practices and systems whereby this level may be achieved? Over what period of time should these objectives be achieved? What practices should be effected immediately? What practices and systems should be in operation within 5, 10, and 15 years? What are the obstacles and resistances obstructing desired land use and soil conservation practices? How may these obstacles and resistances best be overcome? What types of operational and educational programs are best suited to the achievement of these objectives? To what extent and under what conditions are expenditures of public funds on private lands justified? How can public funds expended on private land be protected from private exploitation?

IV. Situation and Problems in the "Ida-Monona Soils Area" and Adjacent Missouri River Bottom Lands

The Ida-Monona soils area is located in western Iowa just east of the Missouri River. This places it near the western part of the Corn Belt. The area occupies a strip about 100 miles long and up to 35 miles wide. It includes about 1,000,000 acres of farm land, which is about 3 percent of the farm land of Iowa.

Iowa's largest bottom-land area—the broad Missouri River bottoms—lies just to the west.

The Ida-Monona area as a whole is a productive farming region, although some of the upland is too hilly and some of the bottom land is too wet to make good farm land. However, the area as a whole produced as many harvested crops per acre of all land in farms as the average for the entire State during the war period. Production on the bottom land is about at the same level.

About 13 persons of all ages live on and are supported by each section of farm land. Since much of the land is rented, many nonfarm land-owning persons also get considerable income from this area.

The area is part of a much larger geographical region that follows a generally similar type of farming. This broad area lies on either side of the Missouri River. It extends from the southern part of South Dakota to northwestern

Missouri. Meat animal production is the dominant type of farming although cash grain farming is common, especially on the river bottoms. The Ida-Monona area is the hilliest section in this larger region.

Since this area lies toward the western part of the Corn Belt, rainfall here is less certain then farther east. However, with good farming methods, production of the upland soil is reasonably good to excellent except in extreme drought years. The bottom lands suffer in years of heavy summer rainfall, but much of the hill land fares better than usual under these conditions.

The area receives some 28 to 30 inches of rainfall annually, much of which falls in quick dashing rains during the summer. The surplus water is carried off by several larger rivers, the Floyd, Little Sioux, Maple, Soldier, Boyer, and Nishnabotna and their smaller tributaries. All of these streams empty into the Missouri River.

Flood conditions are common on these smaller rivers because of the steepness of the land and the quick dashing rains in the area which they drain. Originally these streams were shallow and crooked. They have been straightened in an attempt to carry the water away faster, which may have contributed in part to the present gully problem. Bottom land flooding is made even more serious because of the broad width of the bottom and the sluggish movement of water across this level area. A large investment in drainage channels, dikes and the like has been necessary on the Missouri River Bottoms in Monona, Woodbury, and Harrison Counties to make it possible to farm the bottom land. Moreover, the continued heavy silting of the channels across the bottom land requires large and regular expenditures to keep them cleaned out. It is often difficult, if not impossible, to drain the surface water off the bottom land during and after heavy rains when the ditches are running full from upland area run-off.

The area is peopled by an industrious and thrifty type of farmer. In earlier years, it seemed the logical course for them to exploit the fertile soil in order to accumulate capital and raise the level of living in the community. Since a heavy cropping program did not seriously reduce crop yields in the area, there was little incentive to follow other than an intensive grain-farming pattern. The high-income period following World War I led to extreme land inflation. This inflation period fastened high fixed costs on the area. A long deflation followed along with the rather extreme drouth and depression conditions of the 1930's. Two decades were needed to liquidate the high fixed costs incurred after World War I. So exploitive farming was followed through all this period as a matter of course.

Fortunately, the recent higher-income period has not brought any serious recurrence of over-capitalization comparable to that experienced after World War I. Many farmers have held back a considerable share of their higher wartime earnings and still have them available to use to improve their farming and to raise their standard of living.

FARM SIZE AND ORGANIZATION

The family farming pattern that is typical of Iowa is the common one in this section. A few larger farms are found, mostly on the bottoms. In Harrison, Monona, and Woodbury Counties 77 farms of 700 acres or more in size were enumerated in the 1945 census. These large farms are in the minority. In the upland area, farms average 187 acres in size. They average somewhat larger in the bottom.

TABLE 1.—*Proportion of farms by acreage and type, 1945*

Size of farms	4-county area [1]	State
	Percent	*Percent*
30 to 49 acres	3	4
50 to 99 acres	11	15
100 to 179 acres	44	43
180 to 259 acres	26	22
260 to 379 acres	12	12
380 acres and up	4	4
Types of farms: [2]		
Livestock	63	60
Crop	19	13
General	16	22
Poultry	1	3
Dairy	1	2

[1] Crawford, Harrison, Ida, and Shelby Counties.

[2] Fruit, vegetable, horticultural and forest products farms omitted. Only farms with gross income of $600 or more are included.

TABLE 2.—*Farm land use in the Ida-Monona area compared with the State of Iowa, 1947*

	Ida-Monona area		State of Iowa	
	Acres	Percent	Acres	Percent
Average farm	187	100	170	100
Row crops	74	40	60	35
Small grain	38	20	27	16
Alfalfa-clover and timothy hay	12	6	15	9
All pasture	41	22	51	30
Other farm land	22	12	17	10

With commercial family farming as the dominant type, more capital is used in carrying on farm production. Farming is generally mechanized, labor output per man is well above the Corn Belt average, and farms in general are well provided with working capital.

In a four-county area that is fairly representative of upland farms (table 1) livestock farming was the most common type as classified by the Federal census in 1945. About two-thirds of the farms were livestock farms and about one-fifth were crop farms with corn as the major cash crop. Only 2 percent were specialized dairy or poultry farms.

In the upland areas, about 80 percent of the feed units produced on farms is grain, and most of this is corn. The remaining feed is about evenly divided between hay and pasture.

This proportion has changed very little during the past 30 years. During that period corn yields per acre have risen nearly 50 percent while oat yields show less than a 10-percent increase. Hay yields have risen considerably as tame hay has gradually replaced wild hay, and as alfalfa and other legume mixtures have replaced the older kinds of tame hay. Hay yield data are not accurate enough to make exact comparisons.

This combination of feed encourages the production of meat animals, especially hogs and fattening cattle.

More than half of the corn fed in the area goes to hogs, according to the best estimates. Hogs are generally fed to a rather heavy weight since nearly four out of five pigs are farrowed in the spring. On beef-feeding farms the spring pigs follow cattle and are often carried on the farm until the cattle have been fattened. On rented farms, spring pigs fit in better with the tenure situation.

Cattle feeding ranks next in importance to hog raising. Many of the cattle are fed during the winter and spring. About one-fourth of the cattle fattened in Iowa are fed in an eight-county area in this part of the State. The large grain supply and less plentiful hay and pasture supply encourages shorter feeding periods. This program also is encouraged by the nearby location of the Sioux City and Omaha feeder and fat cattle markets. Farmers are able to capitalize on their skill as buyers and sellers of cattle as well as making use of their feed crops for cattle fattening. Thus, the feeding of medium to heavier weights of cattle fits in with the feed supply of this area, with the marketing conditions, and the management, skill, and ability that farmers have developed to make profitable use of this situation.

There has been some trend toward feeding a larger proportion of medium and lighter weight cattle that are better adapted to a longer feeding period and to more use of pasture and roughage. Summer cattle-feeding programs on grass are somewhat handicapped by occasional droughts. As farming systems are developed which reduce the effect of droughts on summer feed production, this system is likely to expand.

Dairying and poultry production are, for the most part, supplementary enterprises on the farms in this part of Iowa. They are by no means unimportant but they are not commonly considered to be a major source of income. Dairying is more important near the urban centers such as Sioux City. For example, Woodbury County was listed as having 35 specialized dairy farms of commercial size in 1944, while Monona and Harrison Counties together had only 10 such farms.

Two general adjustments in farm plans seem to be under way at present although the rate of change is not great. One of these adjustments is the slow trend away from the very heavy acreage of corn. Over a 35-year period, this

area has shown a slight downward trend in intertilled crop acreage. This is in contrast with a slight uptrend in the State of Iowa as a whole. The forces back of this down-trend seem likely to continue until a new point of balance is reached.

The second adjustment is toward a larger use of hay and pasture. One change is to use more hay and pasture in the ration of roughage consuming animals. The other is to increase the number of such animals on farms. While data are lacking, the trend seems to be a definite one and in keeping with the land use pattern described above.

TENANCY AND OWNERSHIP

Tenancy is relatively high in this area as compared to the entire State. In 1949, 49 percent of all farms were operated by tenants as compared to 42 percent for all of Iowa. In 1900, it was 39 percent as compared to 35 percent for the entire State. In 1920 the comparable figures were 46 and 42 percent, and in 1940, 56 and 48 percent.

In addition, many owners rent some additional land. As a result about 54 percent of all the farm land in the area is under lease and 57 percent of the farms contain some rented land. Thus, over one-half of the land and farms of the area involve rental arrangements.

There are some indications that ownership turn-over in this area is somewhat higher than for the State as a whole. In Iowa about 70 farms out of each 1,000 are transfered each year to a new set of owners.[1] This high rate of turn-over interferes with long-term land-use systems and planning. Under the present rate of turn-over, an equivalent number of all farms in the area will change ownership each 14 to 15 years.

The usual problems of tenancy and ownership prevail in this area. The 1-year crop share lease is the most common form of renting. Since the tenant is not sure of remaining on his place beyond the current year, he makes few improvements and avoids adoption of cropping systems of a long-term nature. Such practices are not conducive to good land use and soil conservation.

Landowners are reluctant to make improvements from which they do not receive immediate benefits. The reluctance of land owners to build fences and livestock buildings or to provide permanent pastures handicaps cash and crop-share tenants in carrying on good land-use operations.

This combination of attitudes and relationships creates serious land use problems which must be dealt with in any long-run land use program in the area.

SOILS OF THE AREA AND THEIR SPECIAL MANAGEMENT PROBLEMS

Originally most of the Ida-Monona area was covered with grasses. Some trees grew along the streams and in wind-protected coves and on east-facing slopes.

In the period since this section was settled, some trees have established themselves on pastured areas. This probably is due to the fire protection afforded by the pasture land.

Most of the Ida-Monona area has steep slopes. The steeper areas usually occur along the bluffs of the Missouri River bottom lands.

The material from which most of the upland soils were formed was blown from the Missouri bottom lands upon the hills thousands of years ago. This wind-blown material, called loess, is mostly silt. It has very little sand or clay and is not sticky when moist. Close to the bluffs where the loess is thickest, it has a depth of 40 to 50 feet or more. Where the loess is deep and mostly silt, almost vertical road cuts are possible.

Some of the soils were originally quite high in organic matter, although on most of the steep slopes the organic matter layer, or topsoil, was only about 4 to 6 inches thick. In coves and on the gentle slopes the topsoil was darker and deeper, sometimes as thick as 15 to 20 inches. Variations in the original thickness of the topsoil of several soil types are shown in the soil-profile diagram (fig. 2).

Bottom-land soils vary greatly in organic matter content and topsoil thickness. Luton clay soil has black topsoil, usually 15 to 18 inches thick. Hornick silt loam soil has a grayish-colored topsoil.

[1] The Farm Real Estate Situation, USDA Circular No. 754, 1946.

DRAINAGE AND FLOODING

Crops on the bottom land are damaged by: (1) levee breaks on main-stem drainageways, (2) Missouri River floods, and (3) the lack of adequate means for removing surface water.

Very little bottom land is adequately drained. The water table in the bottom land is frequently within 12 inches of the ground level during April, May, and June.

Use of tile is not generally satisfactory. One problem is the lack of suitable outlets. Another problem is the impermeable character of the subsoil in much of the area. Because of the tight, slowly permeable subsoil, water moves to the tile very slowly and little or no benefit results if tile are installed at spacings that are economical. Of the areas that are tiled, from one-third to one-half is usually drowned out. Practically complete crop losses have occurred in 5 of the last 20 years.

Public drains, consisting mostly of open ditches, now in operation represent an investment of some $760,000. About 35 percent of the cropland (442,000 acres) is in drainage districts. From 10 to 35 percent of the cropland is in need of drainage restoration.

The use of grasses and legumes regularly in the cropping system is not practiced by farmers in the bottom-land areas. This probably is due to the lack of livestock on these farms and to the hazards to crop and livestock production.

EROSION AND DEPLETION

Erosion is severe in the upland area. The steep slopes and silty soils both contribute to the condition. Sheet erosion occurs extensively, and deep gullies form in the natural drainageways, where the Napier and Kennebec soil types occur.

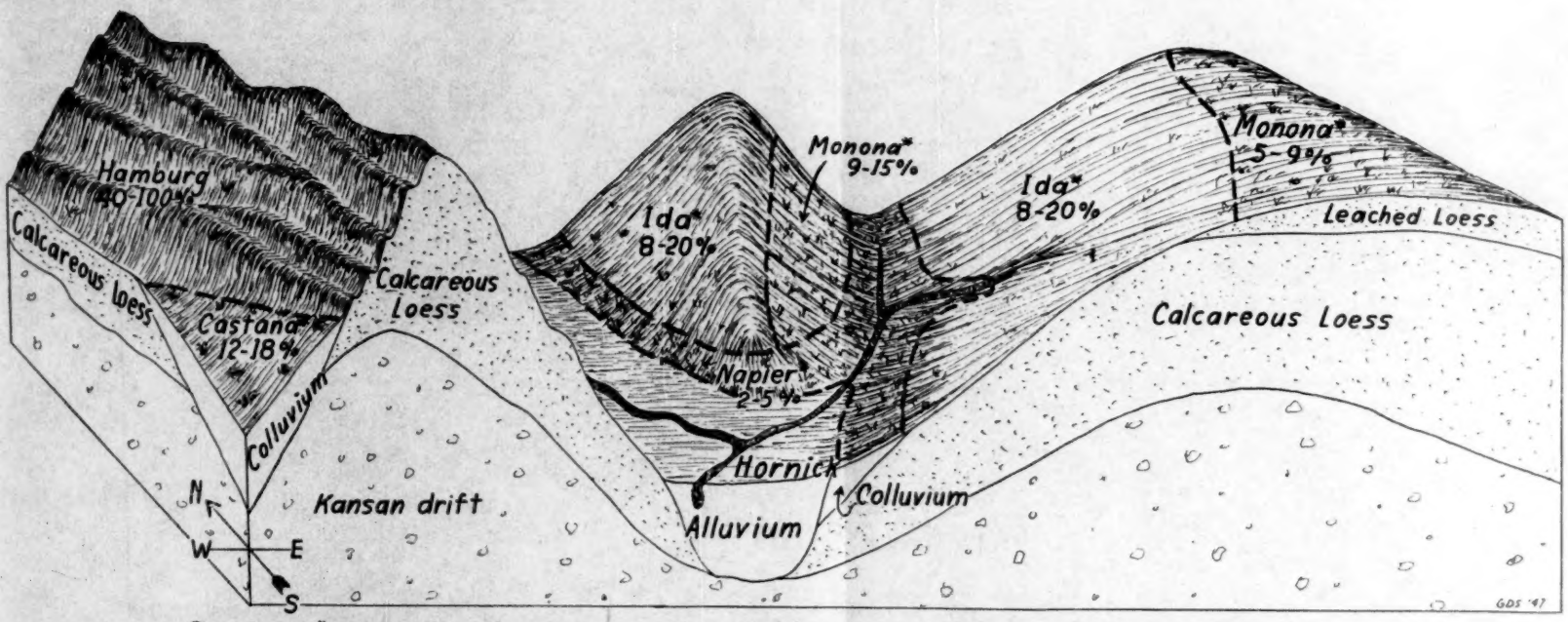
Mr. ANDERSON. In these drainageways the vertical fall or grade is high. As runoff from the adjacent steep slopes is concentrated in them, steep, straight-walled gullies develop quickly. The more intense the rainfall and resulting runoff, the faster they develop. Often these gullies are 50 to 60 feet deep. Many are 100 feet or more wide and their length may be from 1 to 5 miles. These gullies are perhaps the most serious problem in the area.

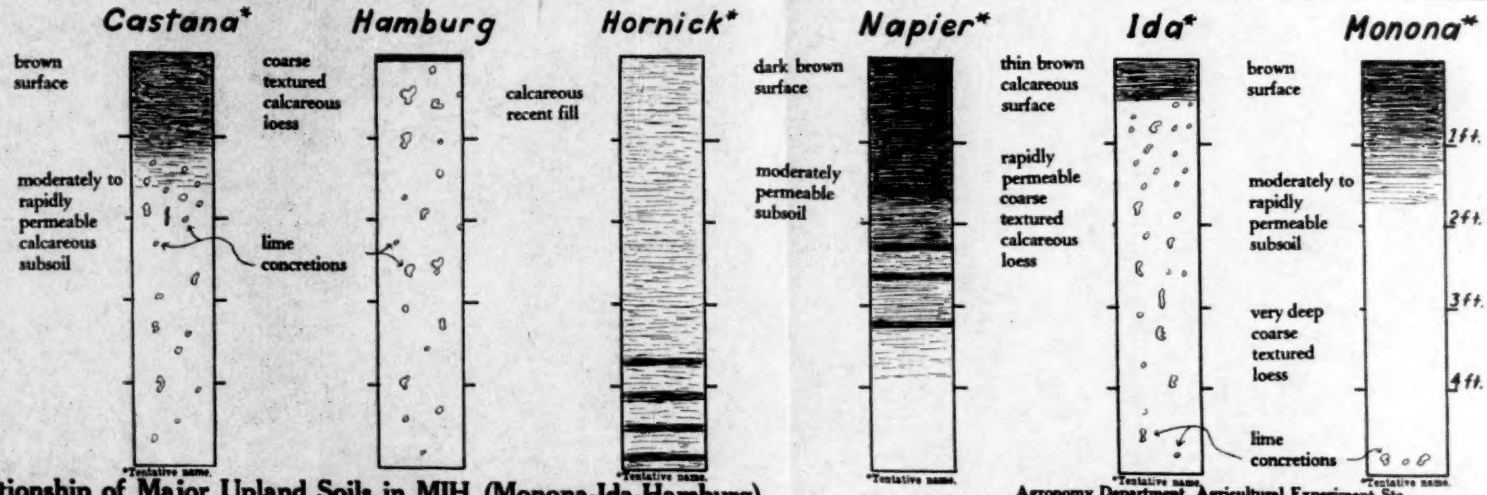
Although the gullies are one of the more serious problems, sheet erosion also is serious. Cultivation of corn up and down steep hills of this area has contributed to the sheet erosion problem and increased the runoff. Almost all of the original topsoil of the cultivated areas of the Ida silt soil type has been lost by erosion. Likewise, sheet erosion has removed much of the original topsoil of the Monona silt loam soil type.

Ida soil, in its virgin state, had only 4 to 6 inches of topsoil. Monona soil ranged from 6 to 12 inches. On the Monona soil where the slopes range from 2 to 5 percent, much of the original topsoil still remains, but on steeper slopes it has largely been washed away.

Indicative of the high rate of erosion on these soil types are measurements taken at the Western Iowa Experimental Farm near Castana. From May 15 through December 31, 1948, 22 inches of rain fell at this farm. On Ida silt loam soil with a slope of 14 percent, 38.3 tons of soil per acre were lost from corn planted up and down the slope. This represents a loss rate of an inch of soil in from 3 to 4 years when farmed this way.

Because the Ida and Monona soils are the most extensive types of the upland soils of the Ida-Monona area, this rate of loss is particularly serious. The steepness of the slopes—many of which are above 12 percent—makes it difficult to use many of the accepted erosion control measures.





Relationship of Major Upland Soils in MIH (Monona-Ida-Hamburg) Soil Association Area to Parent Material and Slope.

Agronomy Department, Agricultural Experiment Station and Extension Service, Iowa State College; Division of Soil Survey, Bureau of PISAE and SCS, U.S.D.A.

This diagram shows the relationship of the soils of this area and the characteristics of the several soil types.

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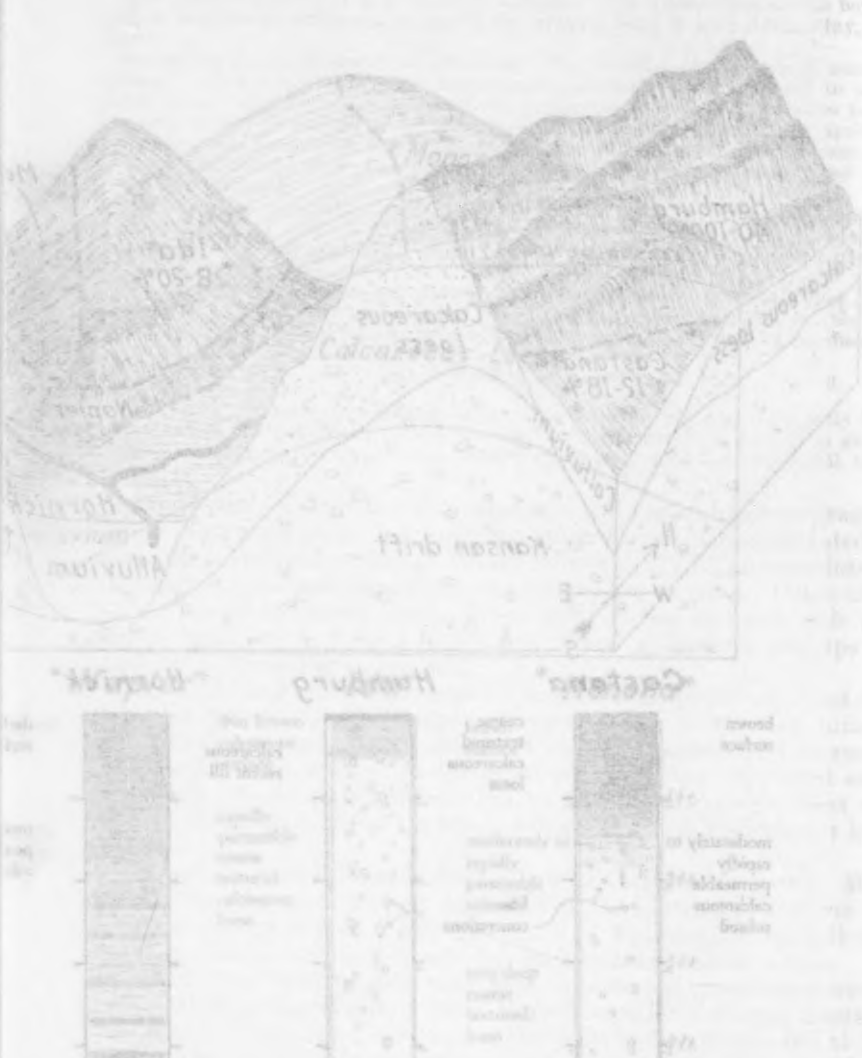

Although the entire area has not been surveyed, good estimates of the percentage of soil within various slope classes have been obtained in Woodbury County. This range is shown in table 3.

TABLE 3. *Percentage of land in Woodbury County by slope classes*

Slope classes percent:	*Percent of area*
0 to 1	17.8
1 to 5	13.0
5 to 9	22.4
9 to 14	29.9
14 to 18	12.3
18 to 24	3.9
24 up	.6

Although detailed surveys of erosion and soil depletion in the Ida-Monona area have not been completed, preliminary data from Woodbury County, summarized in table 4, may be taken as an estimate of the problem in the area as a whole.

To arrive at a basis for management of various soils it is helpful to group, them according to their characteristics, percentage of slope, extent of erosion and drainage problems. Such a grouping of Woodbury County soils is made in the following classification.

Classification of Land According to Physical Soil Factors and Its Relation to Land Use (Woodbury County)

Class I: Nearly level soils with slight hazards to the maintenance of the soil and requiring no treatment other than good management to control erosion and maintain production. These soils comprise 15 percent of the total land area.

Class II: Land with moderate hazards as to the maintenance of the soil and to crop production. These soils comprise 19 percent of the total land area.

Subclass IIa: Sloping land (2 to 9 percent) where erosion is the dominant hazard.

Subclass IIb: Nearly level soils where wetness is the dominant hazard (only 1,200 acres in this class).

Class III: Land with severe hazards to the maintenance of the soil or to crop production. These soils comprise 43 percent of the total land area.

Subclass IIIa: Sloping (9 to 14 percent) lands where erosion is the principal hazard.

Subclass IIIb: Nearly level (0 to 2 percent) heavy textured soils where wetness is the dominant hazard (68,000 acres in this class).

Subclass IIIc: Level to gently sloping (0 to 4 percent); light textured soils where the dominant hazard is drought.

Class IV: Land with very severe hazards to the maintenance of the soil and to crop production. Its use for row crops is restricted. These soils comprise 15 percent of the total land area.

(No land was wound in class V, consisting mostly of grazing land.)

Class VI: Land suited for permanent vegetation but needing moderate care or restriction in management. These soils comprise 5 percent of the total land area.

Class VII: Land suited to permanent vegetation but needing severe restriction in its use and management. These soils comprise 3 percent of the total land area.

TABLE 4.—*Extent of erosion in Woodbury County*

Erosion situation	Percentage of county	Remarks
Little or no erosion	25	
Serious sheet erosion	25	Moderate gully problem in natural drainageways
Severe sheet erosion	50	Severe gully problem in natural drainageways

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TABLE 5.—*The effect of nitrogen and phosphate fertilizer on yields of oats and upon stand and yield of hay* [1]

Fertilizer (pounds per acre [2])		Oat yield (bushels per acre)	Alfalfa stand (plants per square foot)	Hay yield (tons per acre)
Nitrogen	Phosphate			
0	0	12.8	18.1	.43
20	0	13.7	16.5	.44
0	80	19.1	24.2	2.17
10	80	33.1	22.1	2.16
20	80	31.8	21.6	1.95
40	80	49.0	22.1	1.75

[1] Data from Western Iowa Experimental Farm, Castana, Iowa for 1947–48. Second annual report, Western Iowa Experimental Farm, 1948. FSR–1, Iowa State College.

[2] Nitrogen applied as ammonium sulfate and phosphorus as superphosphate. Phosphorus represents pounds of P_2O_5 per acre.

FERTILITY AND MOISTURE DEFICIENCY PROBLEMS

Ida soils have an extreme deficiency of available phosphorus. As these soils contain lime at the surface the phosphorus is present mainly as apatite, or "rock phosphate." This phosphorus is only very slowly available to corn, oats, and meadow crops such as alfalfa and bromegrass.

Table 5 shows that oat and alfalfa yields may be increased by addition of soluble phosphate fertilizer. The data show that unless nitrogen is present in adequate amounts, best results from phosphate fertilizer cannot be obtained for oats. Thus, the Ida soils need application of phosphate fertilizer, and nitrogen either as manure or as fertilizer.

Monona soils, especially if severely eroded, are low in nitrogen. Good yield increases have been obtained from nitrogen fertilizer applied to the oat crop. Phosphorus in Monona soils is more available and yields are not limited as on the Ida soils.

Detailed information on the phosphorus needs of other soils of the area is not available. Phosphorus may give good returns on some of the other soils, but it is not likely that deficiencies will be as extreme as for the Ida soils.

In general, potash is not needed for most of the soils at the present time.

Nitrogen is low on many soils. For small grain crops, nitrogen fertilizer will increase yields on some soils. Nitrogen fertilizer will often increase corn yields, especially on eroded Monona and Ida soils. Most of this nitrogen can be obtained from improved rotations and manures.

Moisture deficiency is a problem on several soils of of the area. Ida and Monona soils have low water-holding capacity. Ida soils have lower moisture-holding capacity than Monona. On both of these soils, the corn yield is reduced if a drought occurs. This drought hazard is increased if deep rooted legumes such as alfalfa are grown for several years ahead of a corn crop, because they deplete the subsoil moisture.

TILLAGE PRACTICES

Contour listing is being used in the area to control erosion and conserve moisture. Studies at the soil-conservation experimental farm in Page County show that soil and water losses from contour listing were only one-fifth of that when the rows were listed up and down hill. Contour listing is about twice as effective as contour surface planting in reducing runoff and erosion. It saves time and labor and makes weed control easier.

At the present time listing is used on about 90 percent of the Ida-Monona area in Fremont and Mills Counties. It is used to a smaller extent in West Pottawattamie and Harrison Counties. The lister is used on only a few farms in Woodbury, Monona, Plymouth, and other northern counties in the Ida-Monona soil area.

With listing there is the risk of reduced stands by silting-in of the furrows on the light-textured soils during heavy rains. Two other disadvantages of listing are the present lack of satisfactory fertilizer attachments for listers and the fact that the seed is placed in cool, moist soil where the seedbed is not well prepared.

Over a period of years, there is no significant difference in yields on listed fields as compared to plowed fields. In years of low rainfall there is a definite advantage in favor of listing.

Level terraces, supported by necessary cropping practices, are used on some of the upland soils. They can be used since the rate of water infiltration is high.

CROPS, MEADOWS, AND PASTURES

Corn is the most important crop in the Ida-Monona soil area in terms of present acreage and production of feed units. Average yields for 1940 to 1946, inclusive, were 41 percent above the 1890–99 average. The upward trend in corn yields is largely a result of the development and widespread adoption of higher yielding corn hybrids and other technological improvements. Gully erosion now prevents growing intertilled crops on some fields.

The northern corn-root worm has caused extensive damage in some fields where corn is grown year after year. The European corn borer threatens to become an important factor in reducing corn yields.

Oats is the major small-grain crop grown in the Ida-Monona soil area. In contrast to corn, the yield of oats in the four counties in western Iowa was only 7 percent higher in 1940–46 than in 1890–99. Corn produced 1.8 times more pounds of grain per acre than oats in the early period and 2.9 times more in 1940–46. Therefore corn has shown an increasing yield advantage over oats in recent years.

Development of new oat varieties has helped to improve yields in this area. Equally important is the response of oats to nitrogen and phosphate fertilizer, particularly on the Ida soils. More widespread use of better varieties and proper fertilizers should tend to increase the value of oats in the cropping system.

Establishment of stands of grasses and legumes is difficult on the Ida-Monona soils.

Seedings often fail because of lack of moisture. This is due in part to the low moisture-holding capacity of the soils and the lower annual rainfall of the area as compared to the eastern sections of Iowa. Grasshoppers frequently damage new seedings and established stands. Farmers tend to leave stands down longer than is desirable for best yields of the succeeding crop and for good soil management. Much of the tame hay acreage in this area is alfalfa, which is the most productive and best adapted legume for these soils. There is an increasing trend toward seeding bromegrass with alfalfa. Including a grass with the legume may not increase the yield of hay, but the presence of grass roots in the sod helps greatly in erosion control. Grass mixed with alfalfa also seems to be a factor in reducing bloat in cattle.

Drought and heat killed most of the permanent bluegrass pastures in western Iowa in the middle thirties. Many of these pastures were plowed and planted to cultivated crops. Attempts at reseeding with bromegrass often failed because unadapted varieties were seeded. Now Fischer, Lincoln, and Achenbach are used almost exclusively and stand establishment has become more certain.

Some farmers are reluctant to use alfalfa or sweetclover pasture because of fear of bloat. One of the pasture problems of this area is to develop systems of grassland and livestock management to minimize the bloat hazard. A possible solution may in the use of bromegrass-alfalfa seedlings which are harvested for hay in the first year when alfalfa predominates and grazed in the second year when bromegrass has established itself and makes up a major portion of the mixture.

TABLE 5–A.—*The effect of spring application of nitrogen fertilizer on bromegrass seed production, Marshall silt loam, soil-conservation experimental farm, Clarinda, Iowa, 1948–49*

	Yield bromegrass seed, pounds per acre
None	244
20 pounds	449
40 pounds	570
80 pounds	795

Most of the alfalfa seed produced in Iowa is grown in the western part of the State, but seed yields generally have been low. Use of DDT to control harmful insects holds promise for increase of alfalfa seed yields.

Bromegrass seed yields in the Ida-Manona area are not as high as is possible with better management. Yields can be greatly increased in pure stands by applying nitrogen fertilizer (table 5–A) or by growing the crop in cultivated rows. Row plantings, cultivated and fertilized with nitrogen, produce seed yields that provide good cash returns for farmers who are equipped to handle specialized crops.

FORESTRY

In the Ida-Monona and bottom-land soil association areas considered in this report there are 171,891[2] acres of timberlands, or 7.7 percent of the total area in timber.

The major portion of the bottom-land timber is confined to areas subject to frequent overflow and loss of crops. How to manage this timber to produce the greatest returns is a major problem. Numerous acres of overflow lands have been cleared of existing timber stands, drained and planted to crops or used as pasture. Some of these lands might have yielded greater returns when properly managed for timber production than they have yielded or are now yielding in crops or pasture.

The loess hills of western Iowa have not usually been considered as suitable for forest growth. Recent invasion of the loess hills by forest is an indication that these lands may be more suitable for forest stands than was previously thought.[3] The present forest cover, illustrated in figure 7, has spread naturally. The forest invasion has been most rapid on protected sites, but it has occurred on exposed sites and rounded ridge tops.

When all physical and economic factors are considered the results may indicate that a higher percentage of the land in the Ida-Monona soil area should be in timber production.

The main forestry problems of the area are the management and utilization of existing timber; the planting of areas which logically should be in trees; the species best adapted to the area; and the relative productivity and economic return of land in timber as compared with other crops. This includes timber as woodland, trees for erosion control, farmstead windbreaks, field shelterbelts, livestock protection plantings and woodlots.

In general the existing woodlands of the area are not well managed to obtain full production and wise utilization of the timber crop. A high percentage of the woodlands are pastured. This increases water runoff and erosion and destroys the new growth needed for rapid reproduction. Timberland owners are not familiar with the returns which can be expected from the woodlands or plantations. Few realize the taxation benefits available under the Forest Reservations Act. Information on markets and current prices is generally lacking or not readily available to woodland owners. Provisions for assisting the landowners in their forestry problems are inadequate.

It is not known to what extent trees can replace or supplement grass waterways and structures in reducing erosion and controling gullies.

Trees in the upland area are on the north and east exposures and in coves. Investigations are needed to determine if there are species better adapted than bur oak, which is growing there now. It remains to be determined if there are species adapted to the more difficult south and west exposures.

The problems of farmstead windbreaks, field shelterbelts, livestock protection plantings and woodlots are important because of their economic and social contributions. A good farmstead windbreak can reduce the cost of heating farm residences and increase the pleasure of rural life. Field shelterbelts can give worth-while protection to farm crops and result in increased yields during dry periods. They also provide excellent cover for wildlife. Livestock protection plantings can reduce the amount of feed required to produce a pound of beef or a gallon of milk. Woodlots can be a source of lumber for construction of new buildings or maintenance of existing buildings or fences on the farm. The problems involved with these types of plantings are the rehabilitation and management of existing plantings and the bast spacing and species to use in new plantings.

While forestry and trees have played a minor part in the past in the economic and social phases of agriculture in western Iowa, it is believed that they; will

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[2] Iowa Forest and Wasteland Survey, 1935.

[3] A. L. McComb and W. E. Loomis, Subclimax Prairie. Bulletin of the Torrey Botanical Club, vol. 71, No. 1, pp. 46–76, January 1944.

and should play a more important part in the future. Soil conservation and land-use plans for the area should not overlook the many potential contributions of the woodlands.

IMPROVEMENTS ASSOCIATED WITH LAND

The available farm water supply in this area varies considerably. An ample supply of water can usually be obtained from drilled wells 300 to 600 feet in depth, but not on every farm. Dug or bored shallow wells in ravines often supply limited amounts of water, but many are located so they are subject to contamination by privies, or by surface water from poultry or livestock yards.

Ponds and excavated impounding reservoirs have not often been successful on upland soils because of their high permeability and extreme erosiveness.

The upland soils are adapted to the construction of pit and trench silos, but such silos cannot be used on the bottomlands.

ROADS AND BRIDGES

Closely associated with the problems of land use in this area are the roads and the number and size of bridges required to permit passage over the large gullies.

A satisfactory road system is necessary to provide for the transportation requirements of the farms. About 60 percent of the roads are mail routes for postal delivery to the farms. A satisfactory road system is essential for marketing of farm products, for bringing to farms the services required and as an outlet for the farm families. Rural telephone and electric transmission lines follow roads in almost every community.

TABLE 6.—*Data on bridges in selected counties inside and outside the Ida-Monona area*

Counties	Total bridges	Average length of bridges (feet)	Bridges per 100 square miles
Woodbury	925	41	105
Monona	607	62	86
Harrison	935	50	131
Allamakee	556	47	83
Clayton	414	38	52
Dubuque	335	44	54

As an indication that the Ida-Monona area has a serious highway problem, table 6 gives some comparisons of the situation in three counties in this area as compared to three counties in northeastern Iowa.

Generally the northeastern Iowa counties have required fewer bridges because most of the roads were laid out before the land was surveyed. They therefore tended to follow the ridges and hollows. In western Iowa the surveys were made before the land was settled and the roads generally run in straight lines.

The straight-line roads, coupled with the large gullies that have developed in western Iowa, have created a bridge problem that is getting worse. Numerous 75- to 100-foot bridges are now required where not more than 30 years ago 10- or 20-foot spans were adequate. Another road problem is that of highway surfacing. There are few natural supplies of gravel or rock in this area. Surfacing is expensive and few of the roads have a year-round surface.

ATTITUDES TOWARD THE LAND

When this area was first settled the immediate need was to bring the soil into production. Until the land was producing crops it could not provide income to pay for the land and farm homes and buildings, or public improvements like schools, churches, roads and other facilities essential to community life.

It was only after the land had been cropped for a number of years that operators became conscious of the soil losses that were occurring as a result of intensive cropping. The first evidence they saw was the disappearance of surface soil from fields by sheet erosion. This was followed by the development of gullies which became deeper and wider as they cut back into fields.

The need to adopt soil conservation practices still has not been recognized by all farmers. Some operators in this area still believe that the owner has

a right to use or misuse his land as he sees fit. They refuse to recognize that there is a public interest in soil losses or that there is a responsibility on the part of individuals and of the community to preserve the soil for future generations. On the other hand many operators see the need for conservation and are adopting good land use practices.

V. Principles of Good Land Use in the Ida-Monona Area

Soil conservation has been defined as maximizing productivity of land over the long run in terms of what people want and what particular lands are best able to produce, in terms of costs and prices.

Long-time land-use programs should consider a large number of interrelated factors, some of which are outside the geographic area being studied. For example, major changes in total crop or livestock output of this area may affect prices of these products, which in turn affect the profitability of land-use shifts. Furthermore, changes in demand for products of the area will affect the profitability of the farming system followed.

Land-use objectives and recommended changes needed to maximize long-time productivity of the land have been developed out of the best information available. Additional research may show the need for changing these recommendations. Soil erosion does not wait, however, for the completion of research. It is imperative that more action be taken toward improving land use within the limits of available information.

It is recognized that corn is and will continue to be the principal crop in the Ida-Monona area. This does not mean that the present corn acreage must be continued nor corn produced on every farm. Experimental studies on Marshall soils at the Page County Soil Conservation Experimental Farm show that total corn production per farm is usually increased by growing corn in a rotation with legumes rather than using the land to grow corn every year. Including legumes and meadows in the rotation on Ida-Monona soils is important to the control of erosion as well as raising corn production. Only in this way is it possible to maintain sufficient organic matter, which is the basis of erosion control programs.

Hold Soil Loss to a Suggested Level

In order to provide for maximum farm production over a period of years, further gully formation should be prevented and present gullies should be stabilized. Gullying not only destroys the soil beyond the limits of renewability; it also interferes with farming efficiencies and soil improvement practices.

According to the best available information on Ida-Monona soils, gully formation can be controlled if soil losses on sloping land are held to around 5 tons per acre per year. This figure is not based on careful evidence and may be too large or too small. Nevertheless it is believed that soil losses of 5 tons can occur without danger to the soil in this area. Losses much larger than this will result in gullying.

The permissible loss of 5 tons per acre per year of these soils must be continually reappraised as information becomes available on soil and water losses, land use, soil fertility, and changing economic supply and demand situations.

Variations from Soil Loss Level

The annual permissible soil loss of 5 tons per acre is an average for all years and may vary from year to year above or below this average. Soil losses for any particular year are affected by weather conditions, land use, and tillage practices. Soil losses for a short period of years are influenced by crop rotations which may be regarded as rotation variations. Soil losses may also be affected by the proportion of various crops grown in the rotation as directed by relative price changes which may be regarded as business cycle variations. The main point is that soil losses over a term of years should not exceed the 5 tons per acre considered the maximum to maintain soil fertility and prevent gully formation.

Rotation Variations in Soil Losses

During the rotation cycle, soil losses vary with crops produced each year. Intertilled crops such as corn and soybeans result in considerably higher losses than 5 tons per acre, with pasture crops less than this amount. As shown in figure 9, soil losses from continuous corn experiments on Marshall silt loam planted up and down hill were 40 tons per acre. Continuous meadow resulted

in soil losses of only 0.2 ton per acre annually in the same experiment. Corn followed by oats (and sweetclover) brought losses to 15 tons per acre, and a corn, oats, and meadow rotation resulted in soil losses of 10 tons per acre.

Figure 10 illustrates variations in soil losses for individual crops and years of the rotation. Soil losses resulting from meadow use are only 0.2 ton per acre as contrasted with 20 tons per acre from corn the following year. If the land is used for corn again the third year, soil losses jump to 26 tons per acre. In following corn with oats, soil losses are reduced to 13 tons per acre or one-half those of the preceding corn crop. If hay or meadow crops are sown with the oats and kept the fifth year of the rotation, soil losses are cut to a negligible amount of 0.2 ton per acre. In both of these examples the crops were grown in test plots located on a 9-percent slope, and row crops were planted up and down hill. Losses are much smaller with contour farming.

BUSINESS CYCLE VARIATIONS IN SOIL LOSSES

During the war and postwar years, soils were exploited to the end of winning the war and aiding the peace. This heavy cropping of the soil may have been temporarily profitable to farmers as well as necessary to the Nation's welfare. But in years to come, soil losses occasioned by the war must be compensated for through soil improvements.

When prices of farm products rise rapidly, there is real incentive and considerable justification for farmers to farm land more intensively. In an attempt to maximize returns, however, it is not justifiable to deplete the soil beyond the point where it cannot be renewed. When prices are low, as they were during the 1930's, there is justification to build up the soil resources for future emergencies and times of higher prices. During a period of low prices, land improvements can be made at lower costs. Farmers who built up their land during the 1930's were in a position to reap the harvest of large production, coupled with high prices during the 1940's. Soil-building programs of this nature came into being during the 1930's. Stimulated by payments from the Agricultural Adjustment Administration (PMA), the labor services of the Civilian Conservation Corps, the technical assistance of the Soil Conservation Service, and information from Iowa State College, farmers adopted many conservation practices. This resulted in a land-use pattern similar to that shown in figure 11. As a result of these programs farmers built up a reserve of fertility upon which they drew heavily during the 1940's.

LIMITS OF PERMISSIBLE SOIL LOSSES

The question now arises as to how far soil losses can depart from the average permissible loss of 5 tons per acre without doing irreparable damage to the soil. As long as the soil losses occasioned by depleting crops such as corn can be erased by soil building crops such as hays and meadow, the soil resources have not been damaged unduly. In this instance the soil may be regarded as a bank account. The farmer is checking on his soil bank account when he plants depleting crops such as corn. By checking on his soil bank account in this manner the farmer is using his account as an investment to make more profits for his family's living and for further improvement of his land. On the other hand, the farmer makes a deposit in his soil bank account when he plants soil-building crops such as hays and meadow. His main objective should be to safeguard his soil bank account with an adequate balance of soil productivity.

There is a zone in soil losses, however, beyond which the soil cannot be brought back. In other words, the soil bank account becomes overdrawn and "bankrupt," so to speak, and is beyond redemption. This point or zone begins with deep gullying, an exceedingly critical point in land use. It is the critical zone between renewable and nonrenewable soil resources. Although available information does not permit the precise determination of this point, efforts must be made to recognize its importance and to stop short of it in land use of the area. It appears that this point has been reached in some of the Ida-Monona soil area.

VI. Long-Term Land Use Recommendations

This section deals with recommendations for a changed farming program in the Ida-Monona area. It looks forward to changes from the present system which is exploiting the soil to a system that will maintain soil resources and in some situations improve them. The recommendations take into consideration changes in patterns of farming and the influence they will have on people and their mode of living.

These recommendations are based on the limited knowledge and information now available and must be considered as preliminary. Then, too, economic conditions are constantly changing so that any set of recommendations must be continually reappraised and adjusted in light of such changes. It is necessary to appraise the future, and this area has been visualized as part of a national economy not greatly different from that which prevailed in the United States in the early postwar period. These recommendations may be modified by later developments and as more and better information is available.

GENERAL MANAGEMENT OF RESOURCES

In considering how farms should be managed and what crops should be produced, farmers must pay attention to all their resources—to the use of the land, labor, capital, and management. The best use that can be made of one resource must be considered in the light of how it affects all the others.

In deciding how much of one crop, such as a forage, should be grown, it is necessary to consider how that crop will fit into the farm's general crop and livestock program.

Individual farmers consider certain factors when making decisions as to programs aimed at getting the greatest return from land, labor, capital, and management. These are: (1) the rates at which these resources can substitute for or work along with each other, (2) the relative cost in money or effort, and (3) the scarcity of various resources.

National programs, likewise, should be considered on the same basis. Just as a single farmer must look at the entire picture when he makes decisions, so must those who plan larger programs. Only in this way will the incomes of farmers and the living standards of society rise to the highest levels.

Farmers do not always adapt their resources in the best manner. There are certain principles, however, which serve as a guide if the individual and society are to realize the greatest benefits.

Important heer as they apply to capital, labor, and land resources in combination are: (1) the advantages farmers in a particular area have for certain kinds of farm production compared to other areas; and on the individual farm, (2) principles of products or enterprise combinations, (3) principles or resource combinations for single commodities, and (4) principles of scale operations or intensity of production.

GENERAL CONSIDERATIONS

Based upon these principles of land use, two general types of shifts and improvements in land-use in the Ida-Monona area are indicated. First are the adjustments to be made on the individual farms; the second those that go beyond the farm boundaries and affect the general public. These latter improvements include such things as changing road systems, construction of large dams and silting basins, reforestation when feasible, and the like.

One of the first steps recommended in correcting the present situation is a survey of changes needed in the road system to better adapt it to proper utilization of the land.

The best kind of road system must take into account land contour, population centers and community centers of interest such as churches and schools. But it must be modified to fit the needs of the present farm-building sites which are headquarters for the operation of the farms. A wisely designed road system will encourage many farm building sites to be relocated during the next 25 or 50 years. Changes in road lay-out cannot readily be made under present laws of road abandonment.

Along with the construction of a revised road system should go the building of larger dams, silting basins, planting of trees, and the like in or adjacent to the area. These public investments are needed to overcome or offset the effects of gullying that has already occurred or as a part of the future erosion control system. Such improvements will contribute to flood-control programs outside the area. In many cases these dams, reservoirs, and the like can be combined with the revised road system in order to reduce public cost and increase their effectiveness.

Ove a period of years, a large capital investment in structures that make it possible to carry the runoff water down to the level of the river bottom, and thus partially fill the deeper gullies and prevent their extension, would permit a larger acreage of row crops in the area that could otherwise be grown. The people in the area could probably afford a considerable capital investment in such

structures in view of the long-run income benefit. The size of the capital investment needed and the income effect compared to other choices have not been studied in detail.

Public investments such as these generally result in increased values of land adjacent to the improvements. Careful estimates should be made of the private gain likely to accrue to those living within the area. These gains should be assessed against the area. But such a charge should be distributed over a long enough period of time to avoid an undue burden on the people now living there. If private gains resulting from public investments are not assessed against the area, the present property holders will obtain windfall gains. But care must be used because if a greater cost is charged against the area than is justified by the gains, the people will be unintentional victims of a capital levy or other similar costs. Gains not accruing to local people should be paid for by the general public.

TABLE 7.—*Proposed land-use changes on upland soils to reduce erosion [1] to a maximum of 5 tons average loss per acre per year in Woodbury County, Iowa [2]*

Soil type	Present land use	Estimated present acreage	Proposed acreage change		Percentage change	
			Increase	Decrease	Increase	Decrease
Monona	Corn	67,000		17,000		25
	Oats	33,000		7,000		21
	Hay and meadow	33,000	24,000		73	
Ida	Corn	45,000		22,000		49
	Oats	22,000		8,000		36
	Hay and meadow	22,000	30,000		132	
Upland, alluvial and colluvial.	Corn	63,000		10,000		16
	Oats	21,000	5,000		24	
	Hay and meadow	21,000	5,000		24	
Other upland	Corn	17,000		5,000		30
	Oats	8,000		2,000		25
	Hay and meadow	8,000	7,000		87	
Total upland	Corn	192,000		55,000		29
	Oats	85,000		12,000		14
	Hay and meadow	85,000	67,000		79	
Total acreage		362,000				

[1] Greater details on the basic facts presented in this table and table 8 are in the committee's files.
[2] The likely effect on net farm income of the area if these changes were made has not been studied.

TABLE 8.—*Proposed land-use change on Missouri River bottom to maximize crop output in Woodbury County*

Present land use	Estimated present acreage	Proposed change		Percentage change	
		Increase	Decrease	Increase	Decrease
Corn	49,000		16,000		33
Oats	25,000		1,000		4
Hay and meadow	5,000	17,000		340	
Total	79,000	17,000	17,000	340	37

BASIC RECOMMENDATIONS

The core of the recommendations for this area consists of a combination of a farming system with necessary public works to reduce soil losses to an annual average of 5 tons per acre per year. Experience indicates that it is not so much the crop yield-reducing effects of erosion that are of first concern to the farmers in the area. Rather it is the increased physical difficulties in farming caused by gully formation. The public cost of large gullies that cross the roads has already been noted. The problems caused by local floods and the settling of silt outside the area during and following heavy rains have been mentioned.

The acreage figures in tables 7 and 8 give estimated change in land use in Woodbury County required to make these recommendations effective. But such a land-use pattern is not a goal in itself. Rather it pictures the probable over-all land use pattern that will result if the erosion control goals are reached.

SUPPORTING MECHANICAL PRACTICES

Shifts in acreage alone will not be sufficient to attain the long-time conservation goals desired for this area. Along with the acreage adjustment the general adoption of certain erosion control and soil management practices will be necessary.

Among the practices which should be used generally on farms in this area are terracing, contour planting, contour listing of intertilled crops, strip cropping and full use of all crop residues and manures.

Terraces are more effective in controlling runoff and erosion than any other mechanical practice. Level terraces work well on the permeable soils of this area. Much of the area is steeper, however, than 12 percent—the upper limit for which cropland terraces are recommended.

Contour listing should be used both in the areas which have been terraced and in those too steep to terrace. It is twice as effective as contour surface planting in reducing runoff and erosion. Soil and water losses on contour-listed cornfields have been found to be only one-fifth as great as on fields planted up and down the slopes. Weed control is easier, too, on contour-listed fields.

Contouring reduces runoff and erosion and increases crop yields, but is has definite limitations as an erosion control measure. The capacity of the small contour furrows is limited. They work best, therefore, on land that is not too steep and when rainfall is slow and gentle. The small furrows break through during hard, driving rains and they are relatively ineffective on slopes above 14 percent.

Strip cropping helps to break up long slopes and when used in combination with contour planting makes erosion-control programs more effective.

On most farms a combination of all erosion-control practices will be most effective.

TABLE 9.—*Estimated average yield per acre by soil types resulting from the proposed land-use plan in Woodbury County*[1]

Soil types	Yield per acre							
	Corn (bushels)		Oats (bushels)		Hay (tons)		Pasture (days)	
	Present	Future	Present	Future	Present	Future	Present	Future
Monona	39.4	59.7	30.0	40.0	1.5	2.3	75	130
Ida	19.6	39.4	15.0	28.0	.8	1.3	37	80
Upland, alluvial and colluvial	55.0	70.0	36.5	50.0	2.5	3.0	100	150
Upland, other	33.7	50.0	25.0	40.0	2.5	2.9	62	120
Bottomland (Missouri River)	40.0	50.0	30.0	40.0	2.1	2.7	100	119
All land	40.5	60.0	27.5	40.8	1.7	2.2	71	115

[1] Estimated future yields assure the adoption of crop rotation, improved cultural practices and mechanical practices as needed.

Along with these mechanical practices it is essential that organic matter be incorporated in the soil to the fullest possible extent. Crop residues and manure, either on the surface or mixed with the soil, will help to reduce runoff and erosion. By disking or otherwise incorporating cornstalks into the soil instead of burning them—which is a common practice on the Missouri River bottoms—much of the organic matter will be put back into the soil. In addition, the total amount of available nitrogen for crop growth will be increased.

The shifts in crop acreage and the adoption of other recommended erosion-control and soil-management practices would be expected to increase the yield per acre of the various crops. The changes that could be expected to occur are shown in table 9.

LIVESTOCK ADJUSTMENTS

Changes in the crop-production pattern of the area would be expected to bring about some changes in the livestock plan. To illustrate what would happen to the total feed supply on a 200-acre upland farm in Woodbury County if the general shift in cropping pattern were applied to it the data shown in table 10 have been computed.

Table 11 gives the livestock program and approximate feed requirements for this livestock program on an average 200-acre farm.

Comparing present production figures in table 10 to feed requirements in table 11 indicates that all of the pasture, hay, and oats, and about 75 percent

of the corn are fed on upland farms in the area as a group. This would suggest that about 25 percent of the corn produced on these upland farms is surplus corn for sale outside the area.

The production figures for the present and proposed land-use program in table 10 indicate a small increase in total production of corn and oats under the proposed system.

The proposed land-use program increases hay and pasture. Therefore, the main adjustment in feed use hinges on increased forage crop utilization.

Increased forage crops might be utilized by (1) an increase in the amount of hay and pasture fed per head of livestock, particularly cattle, and (2) an increase in number of roughage-consuming livestock, mostly cattle.

Neither of the above changes is easy to carry out in any large degree. Increasing the hay and pasture fed per head of feeder cattle will change the marketing schedule to be followed and the use of the farmers labor. Such a marketing change may either increase or decrease net returns. Increasing the number of cattle brings about the need for additional capital, buildings, and equipment, and adds to the risk. The effect on net income to the individual farmer from a larger cattle enterprise will vary in each case. The increased supplies of fed cattle in the fall months, if such changes are general among farmers, might result in lower prices for finished cattle at that time of year.

Due to the importance of cattle feeding in the western Iowa-eastern Nebraska area of which this is a part, any program that would bring about a large shift in the proportion of hay and pasture to corn in this feeding area would have a noticeable effect on the entire cattle feeding industry.

In view of the limited knowledge and information available, no attempt has been made to set up a livestock program and feed budget to fit the proposed land-use program. The main home market available for the large increase in forage crops suggested would be a larger cattle enterprise of some kind.

Some increase in numbers of milk cows in this area might be expected, but any important increase in dairying in the near future is unlikely. The regional shifts in dairy production now going on do not indicate any large increase in western Iowa.

TABLE 10.—*Estimated change of crop acres, the increased production and the percent of change for a 200-acre upland farm in Woodbury County* [1]

	Acreage		Percent change	
	Present	Proposed	Increase	Decrease
Corn	99	72		27
Oat	43	38		12
Meadow	22	38	74	
Pasture	22	38	74	
	Estimated production			
Corn (bushels)	3,920	4,260	9	
Oats (bushels)	1,170	1,550	32	
Hay (tons)	36	80	128	
Pasture (days)	1,524	4,260	179	

[1] Various upland soil types in the county figured on percent of total soils. The various soil types included in the same percentage as they bear to the total. Estimated present and proposed acreages and estimated yields prepared by the agronomy section of the Iowa Agricultural Experiment Station.

TABLE 11.—*Present livestock program and feed requirements* [1] *for an average 200-acre upland farm, Woodbury County*

Livestock	Number [2]	Corn (bushels)	Oats (bushels)	Meadow (tons)	Pasture (days)
Hogs	85	1,700	600		
Feeders and stockers	17	700	185	17	800
Milk cows	6	180	130	18	900
Poultry	150	300	160		
Horses	3	75	120	4	
Total		2,955	1,195	39	1,700

[1] A graphic Summary of Iowa Livestock and Poultry, USDA Bul. 926 also Iowa Department of Agriculture, Bureau of Agricultural Economics and 1946 Iowa Farm Census.

[2] Approximate Feed Requirements for Livestock, Pamphlet 121, Agricultural Extension Service, Iowa State College.

SPECIFIC RECOMMENDATIONS

In the upland area (as indicated by the proposed shifts in land use in Woodbury County) the acreage of corn should be reduced by about 27 percent, that of oats by 12 percent and the acreage of hay and rotation pasture increased about 74 percent (table 10). A small amount of cropland would be shifted to permanent pasture. Some additional land would be used for forestry purposes, but no estimate has been made of the exact acreage to be so used.

Adjustments in the use of bottom land are mainly to maximize income over the longer term and reduce risk. Soil loss is not a factor.

It is assumed that a number of agronomic and engineering practices will soon become standards farming practices in the area. Among these are contour listing and planting, use of terraces, grassed waterways, more trees and timber, buffer strips or strip cropping, small dams and more definite crop rotations. The purpose of using these is sixfold. They should:

1. Provide means for infiltrating larger amounts of rainfall into the soil.
2. Provide better ways of conducting surplus water off the land and into streams without undue soil loss.
3. Maintain a favorable physical soil structure and fertility level.
4. Prevent gully formation so that mechanized farming can readily be carried on.
5. Include methods that permit as large an acreage of corn as is consistent with erosion control goals and maximum total production.
6. Include practices that are within the skill and financial ability of the rank and file of farmers who are to use them.

More flexibility in land use is possible in attaining erosion control goals than can be shown in a single table of land-use data. Some farmers will use more sod crops and others more mechanical practices as a partial substitute for sod or close-growing crops in controlling erosion. For example, a farmer may choose to use more terraces than the usual practice. This will require a greater capital investment and larger operating costs but allow a somewhat smaller sod crop acreage to control erosion to the same degree in his particular case. Even though erosion is controlled with mechanical practices it should be recognized that sod crops are essential to maintain soil productivity. Many such variations will occur among farms or from time to time on the same farm as the most practicable combination of erosion control methods.

Attainment of the conservation goal for the area will not necessarily be followed by a static farming pattern. Three kinds of adjustments in cropping plans will continually recur. The goal is to have the average of these kept within the accepted minimum soil loss level and not exceed certain broader soil loss limits at any time. These three adjustments are due to:

1. Conditions rising from climatic and other natural factors. Loss of seedings by drought, for example, would change the crop plan pattern for the following year.
2. The life cycle of the farm family. The cropping plan to be used by a young farmer with limited capital is different from the one that the same man will use in later years as he gains capital and experience. Similarly, the tenure change of a particular farm from ownership to tenancy and back to ownership again will modify the crop plan from one time to another.
3. Variations in general economic conditions often call for changes in the crop plan. At one time, grain may be in relatively strong demand and the price high; at another time prices may favor livestock, perhaps the roughage-consuming kind. Such relative price changes, it should be noted, reflect the over-all demand by society. Competent farmers are alert to changing conditions and modify their farming program to take advantage of them.

INCOME EFFECTS

To the extent that the recommendations widen the margin between gross income and costs the result would be an increase in net farm income. Many of the recommendations are likely to have this effect so a good deal of reliance can be placed on the likelihood of their resulting in increased farm income. This is probable even though the amount of such increase is impossible to estimate on the basis of present knowledge.

If some practices should narrow the margin between gross income and costs, lower net income would, of course, result from their use. This more often occurs during the early stages of crop acreage adjustment to conservation farming.

The net income effects of a general and considerable shift in land use in the area cannot be estimated with any degree of precision. Much depends on the relative level of farm product prices in the future and the costs of producing different product combinations. Income effects from such changes in land use vary widely from farmer to farmer. A farmer who has inherent management ability to handle the revised farming system might find it quite profitable to adjust, while another farmer with more limited managerial capacity might find the shift to be unprofitable. The income effects would also be different during the period of transition than they would be after a longer period had elapsed.

OTHER RECOMMENDATIONS IMPLIED

The above land-use recommendations have inherent in them many less specific recommendatons as to the type of farming to be followed and kinds and intensity of livestock production needed. Obviously, the recommendations call for greater emphasis on the use of roughage relative to grain in total feed consumption. Whether farmers will find it advantageous to keep enough roughage-consuming livestock to use up the proposed hay and pasture supply has not yet been determined. It might pay to plow under some of the forage as green manure rather than feed it. Capital, labor, and building requirements as well as the set of skills needed by farmers will change. Economic risk might increase or decrease; we do not know which would happen. There would also be a need for changing the prevailing types of leases used on rented farms.

VII. Intermediate Land Use Adjustment

It is obvious that the final goal of averaging out soil losses at the level recommended must be reached by gradual changes. No one can predict accurately the number of years needed to make complete adjustment. It is possible also that certain of the assumptions on which the recommendations are based will need to be modified before the goal is reached. And it may be that new technology will suggest a considerable modification of these land use recommendations.

Because of the need for gradual change and to allow for possible changes in final recommendations, a series of interim guideposts might well be established in a county or community. These interim goals might be set up as outlined in table 12. Some such procedure should help farmers, farm leaders, and professional agricultural workers as well as the public generally to visualize the series of progressive changes needed. The effects of each separate change could be seen as the farming system is moved toward a conserving basis. It would give those responsible for carrying on the educational, demonstrational, and technical advisory programs a more exact and comprehensive basis for their work.

Table 12.—*Suggested outline for establishing interim conservation and land-use goals* [1]

Proposed change	Effects on farms in the area as to						
	Soil conditions	Crop yields	Feed production	Capital needed	Farm size	Farming type	Net farm income
1. Use of best known rotations and practices only. (Little land use change)							
2. Use of (1) plus 20 percent increase in sod crops							
3. Use of (1) plus 35 percent increase in sod crops							
4. Use of (1) plus 50 percent increase in sod crops							

[1] The improved road plan, public capital investment for erosion and flood control purposes and certain amounts of forest plantings could be a part of each level of change.

VIII. Public and Private Responsibilities and Relationships

Where land use shifts and soil conservation are profitable to the farmer, public responsibilities are limited largely to research and education. Research is necessary to discover and develop the practices and systems required to attain conservation. Education is needed to translate research into action on individual farms. If desired, the educational process can be speeded up considerably through incentive payments and technical assistance to farmers.

Conservation often pays from the farm viewpoint over a period of years, but for various reasons, including rental arrangements and lack of capital, the individual farmer fails to follow the desired practices. In such instances, society may help remove such obstacles in the public interest of conservation.

Public responsibilities for soil conservation, however, may and frequently do go beyond those practices profitable to individual farmers. This is particularly true where:

1. Public interest is longer term and more lasting than the interests of individual farmers.

2. Benefits that accrue away from the farm where improvements are made may justify greater expenditures on a particular farm than can be undertaken profitably by the farmer.

These principles have long been recognized in land reclamation projects and flood-control levees and dams. But only in recent years have they been incorporated into soil-conservation programs. From the viewpoint of soil conservation, the Little Sioux watershed program in northwestern Iowa may serve as an example. This program, now in its early stages of development, covers 4,502 square miles of productive but rapidly eroding soils. The program has a twofold objective: (1) To hold the soil and water in place, thus benefiting the land on which conservation improvements are made, but also important, to hold soil and water from damaging downstream areas with floods and silt. The estimated goal is to reduce maximum water flow by 20 percent and siltation by 55 percent; and (2) to help maintain the productivity of the land for the benefit of future generations as well as this generation of citizens.

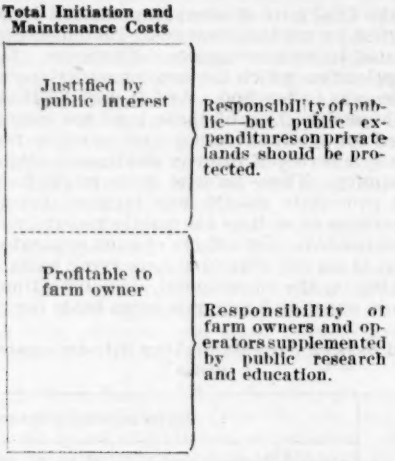
Total Initiation and Maintenance Costs
Justified by public interest
Responsibility of public—but public expenditures on private lands should be protected.
Profitable to farm owner
Responsibility of farm owners and operators supplemented by public research and education.

Fig 12. This diagram illustrates the degree to which landowners and the general public should share costs of soil conservation practices.

Let us illustrate these principles in a specific subwatershed of the Little Sioux. The Nepper project, named after the principal land owner, S. A. Nepper, includes only 500 acres, yet is costing $67,000 in on-site construction costs. This is $134 per acre of public expense in addition to what Mr. Nepper and his neighbors will spend on supplementary practices and maintenance measures. Obviously, individual landowners cannot afford to undertake such expenditures and make them pay out during their lifetimes. Yet, society may afford such an investment providing its costs in terms of offsetting benefits can be distributed not only over future generations but also over hundreds of acres of land downstream which may benefit from keeping water and silt in the Nepper area where it is an asset and not a damage.

This does not mean that society can use expected future and off-site benefits to justify any and all types of land improvements in the name of soil conservation. Care should be taken that public funds are expended where expected

public benefits are greatest and beyond the costs involved. Care should also be taken that public investments on private land are adequately protected from exploitation by individual farm operators and owners. In this respect the soil conservation district is widely recognized as an appropriate instrument for protecting public interest.

Although districts are legally designated as units of local government, they do not have the customary borrowing, policing, and taxing powers commonly enjoyed by other local units. In only two States, California and Colorado, have the districts been granted taxing power in their own right. However, in several other States the county governing bodies have been authorized to tax and appropriate money for special or general work carried on by districts. For example, the Iowa legislature in 1947 authorized county governing bodies to levy a small tax for the maintenance of flood control works.

To be effective the district should be empowered to do more than merely facilitate education and technical assistance to farmers. Funds are needed to maintain erosion control and water conservation installations which have been built at public expense. Also, means should be provided to prevent a small minority of land owners and operators from unduly damaging neighboring farms and public property (such as roads and bridges and water reservoirs) through erosive farming practices.

To carry out some of the more needed land use adjustments it may be necessary to use the tax power if the individual defaults, and charge the cost of the soil conservation practices to the land. Our weed control laws and drainage district organizations afford precedents for such action. The public importance of soil conservation measures appears to be just as great as or greater than that of weed control or drainage.

Finally, the district might be given the power and funds to acquire small but strategic acreages which are unusually severe sources of gullies and sheet erosion and retire such areas from farming. If such areas are widespread, it may be desirable to zone them out of farm use in favor of forestry or other more conservative types of land use. Of course, such powers must come through State enabling legislation. It is important that these types of control measures be preceded and supplemented by adequate educational programs so that individuals may go forward with conservation with a minimum of control measures.[4]

IX. More Information Is Needed

A study of the kind reported in this publication helps to uncover and emphasize the considerable number of problems for which no satisfactory answers are now available.

It has been necessary in formulating this report to draw upon many sources of material and to lean heavily on the experience and knowledge of men familiar with the Ida-Monona area and its problems.

Looking to the future, there appears to be a real need for land-use studies to: (1) Determine the precise nature and magnitude of land-use problems; (2) help formulate specific land-use objectives; and (3) discover and develop farming systems, land-use practices, and institutional adjustments contributing to the realization of these objectives.

Since the Ida-Monona area is wholly within the Missouri River watershed, efforts should be made to integrate all research work undertaken by States and the United States Departments of Agriculture, Interior, and Defense as part of the Missouri Basin development program.

Briefly summarized, areas in which further extensive research is needed are:

A. Basic inventory studies including: (1) Surveys and classification of soils, erosion, and slope. (2) Surveys of land-use patterns and tillage, farming, and livestock practices. (3) Surveys of tenure arrangement, land values, credit, and attitudes toward the land. (4) Surveys of farm organization and management practices.

B. Studies of specific problems and practices including: (1) Conservation objectives and zone of permissible variation. (2) Gully origin and control. (3) Reorganization of road lay-outs. (4) Water-table investigations covering methods of draining bottom land; effect of levees on drainage; and silting basins

[4] We have not attempted to appraise the economic and social implications of such measures. This is used for illustrative purposes since the committee has made no exhaustive analysis of the situation.

to reduce ditch maintenance and improve the soil. (5) Irrigation studies. (6) Problems relating to use of level terraces, contour listing, and other tillage practices on Ida soils. (7) Time, method, and rate of seeding and utilization of legumes and grass mixtures. (8) Forage-crop production and use. (9) Livestock production research. (10) Analysis of livestock rations with increased roughage content. (11) Research on crop adaptation and management. (12) The effect of different cropping practices on soil and water losses and on crop yields. (13) Cover crops in relation to soil and water conservation and crop yields. (14) Weed control. (15) Machinery for conservation farming. (16) Research in tillage practices. (17) Research in forest production and management. (18) Relationship of land use to size and shape of ownership and operatorship units. (19) Research in rental arrangements. (20) Residual values of recommended practices and improvements as a basis for compensation provisions in leases. (21) Capitalization of soil exploitation in land values. (22) Adaptation of credit to land-improvement needs. (23) Economic implications of the proposed Missouri Valley development.

C. Analysis of recommended land-use adjustments, practices, and farming systems including: (1) Classification of land. (2) Economic analysis of proposed land-use adjustments. (3) Extent to which it is profitable for the individual to carry out land-use adjustments and land improvements.

D. Studies of alternative methods and organizations for carrying out desired land-use adjustments including: (1) Methods and means whereby all land use and conservation programs may be better integrated toward achieving unified objectives. (2) Interrelationships between Federal, regional, State, and local efforts to achieve desired land-use objectives in terms of the appropriate responsibilities of each. (3) Appraisal of grants, credit, technical assistance, demonstrations, educational work and legislation as alternative and complementary procedures in achieving desired land-use objectives. (4) Possible changes in the district organization more conducive to desired land-use adjustments. (5) Possibilities of rural zoning in carrying out land-use adjustments and making such adjustments more effective. (6) Analysis of current programs in terms of techniques used and achievement of objectives.

E. Analysis of comparative advantage of Iowa land in producing the products and services needed to satisfy demands, both domestic and foreign.

This outline serves only to emphasize that recommendations which are aimed at changing the operational pattern of a single farm or of all the farms in a geographic area become increasingly involved. Every action has a counter-action and each is involved in a chain of reactions.

Although final and conclusive information is not available on all of the interrelated factors which must be dealt with in the Ida-Monona area, the urgency of the apparent problem is such that immediate action is needed. This should be accompanied and as far as feasible preceded by intensive research in the fields indicated above.

X. Selected References for Further Study

(Available from your county extension director or Iowa State College, Ames)

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3. Let's Examine Crop Rotation. Farm Science Reporter, July 1945. W. H. Pierre and G. M. Browning.
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5. Why Farmers Resist Land Use Changes and How These Resistances May Be Overcome. Iowa Agricultural Experiment Station, 1950. Mimeographed. John F. Timmons.
6. Erosion Control Can Pay Off. (FS–290.) Iowa Farm Science, October 1949. Carl Allen and E. O. Heady.
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10. Third Annual Report. Western Iowa Experimental Farm, FS. 1949.
11. Save That Soil. Iowa Farm Science, February 1948. G. M. Browning.
12. Research Needs of Tillage in Soil and Water Conservation. Journal of Soil and Water Conservation, April 1948. G. M. Browning.
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Mr. LOVRE. Thank you very kindly, Mr. Anderson.

Mr. HOEVEN. In the first place, Mr. Anderson, I am very happy to have you appear here as a witness. I think the audience here is well acquainted with the splendid work being done by Iowa State College and the Extension Service. We are not here to discuss any particular phase of the Missouri River Basin program, but I am glad to have your reference to the Little Sioux watershed project, which is almost entirely in my congressional district. I was interested in having your statement to the effect there was no provision made for research expenses and education. This committee wants to benefit by the errors of the past. This program was established for the development of agriculture. Do we understand that such a program was conducted without any research or any extension education whatsoever?

Mr. ANDERSON. No. I don't want to give that impression. The point is, there had been research and there was extension activity, but with our stepped-up program in the Little Sioux such as we are undertaking, and in the entire basin, it requires right now much more information, much more educational work than our regular programs we have contemplated.

Mr. HOEVEN. Then you will agree with me that what is needed in this particular project is an intensive educational program?

Mr. ANDERSON. Yes. We all recognize research is a slow process and education is a slow process, if you will pardon the illustration. There is great hesitation in initiating new ideas that will be of benefit to agriculture. About twenty-some years ago, or more than that, hybrid corn came to Iowa and other States, and in many places it was adopted overnight, yet the reference I would like to make to you is it took the Iowa farmer, with the extension service of Iowa State College spending a great deal of time working with the Iowa farmer, it took the Iowa farmer 18 years to decide whether he was going to take his seed corn out of this sack or out of that sack. That was the only change in operation he had to make. My point is that as we are attempting to step up the program of agriculture in the Missouri Basin, we should realize it will take a little while for him to make up his mind. My position here today is, we strongly urge that a stepped-up program in the future in the Missouri Basin will require that a research and extension educational program be a very important part of it.

Mr. HOPE. I think you have touched on a very important thing. I agree with what you say about the importance of research and education. At the same time I think there is an urgent need in connection with the agricultural program, as an integral part of the basin program, that we have some demonstration projects so it can be shown what can be accomplished under this program. If we are going to integrate it with the flood-control program and all of those things, which I think must all go together, then we have to know how much can be accomplished in flood control by a project like the Little Sioux. So far as I know, very little money has been spent on those

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projects. I have had many people inquire about it. How much has been accomplished? How much have we learned? How can we apply that in our area? I was quite disappointed a few weeks ago when some members of this committee went to Oklahoma and saw the Washita project to find out how little has actually been done. Yet there has been more done there, perhaps, than anywhere in the United States in developing these little watersheds. I think we are going to have to spend, and I hope we can spend, more money in these projects like the Little Sioux as demonstration projects.

My question is, Do you think, in a project like the Little Sioux, we can go ahead and spend money at a more rapid rate than we have been doing in developing it as a demonstration project and still know what we are doing? Do we have enough research, in other words, to go ahead and work a little faster?

Mr. ANDERSON. I did not mean to imply at all, as you ask the question, that we are not without research and extension education in there. But it requires much more, and there were not provisions made in the Little Sioux project to step up research and educational programs. I don't mean to imply that we are not in position to go ahead. What I am urging is that we do need to recognize the importance of also stepping up the research and educational program to get this established much more rapidly.

Mr. HOPE. I agree with you on that. I would like to have your opinion as to whether it would be advantageous at this time to appropriate more money for the Little Sioux? We are appropriating about $6 million to cover 11 projects. That means we are going so slowly we are not getting anywhere on those projects and we need them for demonstration projects. Can we spend more money on the Little Sioux without wasting it?

Mr. ANDERSON. I think you can. I think maybe a little additional money spent on research and education will help improve that considerably.

Mr. HOPE. Or we could also spend money not only on research and education, but on the actual work?

Mr. ANDERSON. That is right. There has been progress made. There are some excellent situations. Farmers are beginning to accept some of those changes, but it does take time to get these changes in practice.

Mr. POAGE. Unless we can reach a point where we can give a demonstration, show we actually accomplish something with this work, Congress may scrap the program, unless you are able to put something on the ground showing results. I know it has got to be in the books first. But there is enough in the books right now and we can do a whole lot more than we are doing on the ground. Not disagreeing with you at all about the importance of research and extension, but we have got to have demonstration and we have got to do it more quickly or this program could die. This $6 million a year, we are not making enough impression over the United States, and it is highly essential if we are going to maintain this agricultural flood-prevention program. So it seems to me, as Mr. Hope has said, we must emphasize getting these various projects around the United States to such a stage of completion that people can walk in there

and see that it does work or it doesn't work. I believe it will work. I think we have seen enough that it will work, but we haven't enough on the ground to convince most people that it will.

Mr. HOEVEN. In that connection may I comment, that when we were in Oklahoma we were told it would take 50 years to complete one project down there. So we have a tremendous problem facing us. The question of education and research and expenditure of public money. Unless we step up those projects it is going to take 50 years to complete one isolated project in the State of Oklahoma. It is no wonder people become restless and discouraged.

Senator MUNDT. I have one question. That is, where there are evidences of farm benefits of the conservation program you suggested that the Federal Government should share in those construction costs. I agree with you. I wonder if you feel that the State government should also be participating in this, for if the farmer benefits from this soil-conservaion project it will increase the tax base, and tax base is exclusively the right of the State government to tax?

Mr. ANDERSON. We are sort of a union. It starts with the farmer and goes to the municipalities, the county government, the State government, the Federal Government. A complete cooperative program with all involved and participating.

Mr. LOVRE. Thank you, Mr. Anderson.

We have 42 witnesses. It is my sincere desire to give each and every one of you time. That being true, I am going to ask each of the following witnesses if they will keep an eye on their watch and not exceed over 5 minutes. I will try and hold down the members of the committee when it comes to interrogation. We do want to hear everyone that is here, but time is an element, and I think we should close this hearing at 1:30. So please cooperate with me. If any witness has any written statement or any kind of literature you would like to file with the committee, I want you to feel that you can rest assured that we will consider very carefully each and every word. After the proceedings of this hearing are printed each witness will be sent automatically a copy. If there is anyone here, if you don't testify, if you want a copy of the hearing, kindly leave your name and address with my staff and we will be very happy to send you a copy.

Our next witness will be Mr. Paul Opsahl, president of the South Dakota Farmers Union, of Mitchell.

Mr. Opsahl.

STATEMENT OF PAUL OPSAHL, PRESIDENT, SOUTH DAKOTA FARMERS UNION

Mr. OPSAHL. Congressman Lovre, distinguished Members of the United States Congress, Senator Mundt, the question that we are discussing here this morning I think is one of the most important questions of developments in this part of the country that has ever been before the people. I feel it is very timely that we have hearings of this kind to give you distinguished gentlemen here and Members of Congress our observations and views in the development of the resources of this river basin.

This river basin, as it has been brought out, covers approximately 10 States. It is possibly the greatest food-producing area in the United States. Therefore, it is important that when we go ahead with this

project that we are all satisfied that the program is going to work and bring resultant blessings to the people.

The Farmers Union has at all times advocated an MVA, patterned somewhat after Tennessee Valley. We know, over a period of years, that has worked successfully and brought a blessing to the people of that valley. We know that it has met opposition, of course. There are people who do not agree with that line of thinking. Nevertheless we are happy this morning that we have occasion to express our views.

It has been brought out here this morning that possibly there has not been enough study and survey made in the valley relative to the expansion we are about to enter into. We should devote every resource possible to it to realize the greatest good for the greatest number of people. There is a question in the minds of many people that possibly the project as it now is, is built around flood control and navigation. There is a question in the minds of people if we have enough water for navigation. There is a question in the minds of people along the line we are following that it is successful to flood control as we are having disastrous floods every year. It reminds us of what took place this last summer, destruction of property and lands in the millions of dollars. With this question still in the minds of the people, we must be thoroughly convinced that if these factors are placed in the river that they will solve the things we are seeking to do through these projects we are engaged in.

It was brought out this morning there is tremendous pressure for funds and money to meet demands all over the world. We appreciate you gentlemen have a big job on your hands. Though we may not be helpful to you in making suggestions of possibly greater expenditures of funds, we want those projects completed at the most economical cost possible.

The Farmers Union has always believed in a unified, integrated development of the Missouri River. That includes soil conservation, irrigation, power, or any other benefit that might be made to mankind. There is a question in the minds of many people in South Dakota if the power angle of this development is sufficient to take care of the needs due to the rapidly expanding REA in the State and to encourage industry to come to South Dakota. We are very much concerned about that phase of the program. We are very much concerned about soil conservation. We do have problems in South Dakota. Maybe we are going to have to broaden our study, our surveys. Possibly we are going to have to go into the tributaries and into the individual farms to hold this water back where it falls. Those are some of things that we as farmers, and I am a farmer, are concerned with today. There are many people here this morning who are vitally interested in the full development of this river basin and those great resources we have in South Dakota. We would like to recommend the establishment of a national board to pass on the watershed developments, working in conjunction, possibly, with our Army engineers, to be sure that when this vast amount of money is spent that we will have something that we can be satisfied is going to do the job for which it was intended.

Also I want to state here that the Farmers Union over a period of years have endorsed the pattern of the TVA. We think it has worked very successfully there, and people there are happy about it. It has been a blessing to the rural as well as the urban people in that valley.

We know it has been tried and proved successful and we feel and believe that it will work in the Missouri Valley as well. Possibly there are a lot of things, of course, that are different, but I know those things could be ironed out and made successful in the Missouri Valley as well as in the Tennessee Valley.

I believe it is very important, gentlemen, as former speakers have brought out, that thorough study and survey must be made. There are still questions in the minds of the people due to the disastrous floods we have had—if we have solved that problem, or if we can solve it, through the development of this Missouri Basin under the present plan or program, as they are drawn. Those are serious things and we are much concerned about them.

Mr. Congressman, I am not going to take any more time, because I want all of these people to be heard. I want to extend to you gentlemen my appreciation in appearing before you today, representing 20,000 farm families in South Dakota, on this important development of the Missouri Basin.

Mr. LOVRE. Thank you very kindly, Mr. Opsahl.

Our next witness will be Ross Davies, of Huron.

Mr. Davies.

STATEMENT OF ROSS DAVIES, HURON, S. DAK.

Mr. DAVIES. Mr. Chairman, members of the committee, distinguished guests; since notice of this meeting has gone out I have heard a great many favorable comments to the effect that the farmers and others in South Dakota appreciate the fact that this committee has come into the field to hold a hearing of this kind in order to secure the opinions and judgments regarding flood control and soil conservation and other phases of the Missouri Basin development. From the standpoint of one who has certain responsibilities in the soil conservation work in this area and in this State, we deem it a privilege to be invited to attend this hearing and to hear the judgments and opinions being expressed by people at this hearing.

I know you are interested in hearing from people who are actually on the land. I do feel that securing those opinions and judgments will help us who have the privilege of working on this program to do a more efficient and effective job with whatever funds are made available to us to carry out under what form of administration there might be.

Based on experience in soil conservation service in this State, set up under State law, for the last 14 years, I do not hesitate to recommend that there is a field and an opportunity for a soil conservation district to function in every county in South Dakota. At the present time there are 53 such soil conservation districts in the State, covering about two-thirds of the land area. Better than 20,000 farmers are now cooperators with their soil conservation districts. In helping to carry out the program which the district supervises, the district has for their objective the same objective as the Department of Agriculture. That is, to use the land according to its capabilities, and to treat the land according to its needs. We recommend, however, careful consideration to the soil conservation district because they encourage voluntary cooperation and individual initiative and local control to the fullest extent, and soil conservation to be permanent and lasting must include

local participation in all phases, in planning, in application and in maintenance, which is the program which these soil conservation districts are encouraging and carrying on.

Being set up under State law, we have an opportunity to secure the assistance of every agency, public or private, to help out with the program with funds and needs of their district.

Based on what has taken place it is unnecessary for me to tell you the work of the soil conservation service, because you have the facility of the entire organization at your disposal to secure information of the work which is being done and how it is carried on and the recommendations being made. I would just like to call your attention to this fact, that not all of the floods that occurred in the United States this year were down in Kansas or Nebraska, or in Oklahoma or Texas. We also had some flood damage here in South Dakota and it was caused by flash rains and runoffs from upper tributaries, and to some dam loss on the Missouri River and some on the main tributaries. We have right south of Sioux Falls, good land along the Sioux River bottom, and 60,000 acres of some of the best land in South Dakota was inundated this year and out of crop production because of flood damage.

It is a serious matter to individual farmers as well as to communities and the State and to the Nation. In addition to what has taken place right along the Sioux River, there are other areas in the State as well. Some are more critical than others.

In addition to flood problems we have problems of water conservation. In the western part of the State where there is more need for water conservation then in the east end of the State the same thing applies there that applies in the east end. That is, to endeavor to keep as much water where it falls as possible, which will help with the entire development program. In this program of flood control I would like to call your attention to a talk given by Dr. Bennett, of the conservation service, on August 11 of this year, at Lincoln, Nebr., following the survey of the Kansas flood, in which he made this statement: That 75 percent of the flood damage, based on surveys made, occurred above the stream channels themselves. And it includes, primarily, the loss of productive topsoil. That is the thing we are primarily concerned in keeping in place as much as possible. I want to call your attention to the project phases of the flood control program that are interrelated with that job. Those three phases are, first, land treatment. And the individual farmers on the small tributaries that join the main stream. This involves an analyis of the capabilities of the land and the flood practices that are needed to fit the land.

The second phase is what might be called downstream engineering. That is, to take the water down to the main stream channel, which still involves the program of soil conservation.

The third phase is downstream engineering itself, which involves the larger dams.

As he said, they all fit together. We feel the same way in South Dakota, that unless the three phases are given consideration, the program is out of balance. By bringing in all of those three phases it gives opportunity for local participation, which we feel is an important matter. We would also like to encourage that, and in doing that there is a strong educational program needed to supplement the pro-

gram being carried on. This has all helped to develop a national land policy which will help to conserve the maximum amount of soil for the future all over the State and Nation.

Thank you.

Mr. LOVRE. Our next witness will be Mr. E. A. Johnson, of the Farm Bureau of South Dakota. Mr. Johnson.

STATEMENT OF E. A. JOHNSON, REPRESENTING THE FARM BUREAU OF SOUTH DAKOTA

Mr. JOHNSON. Mr. Chairman and members of the committee, I have a written statement which I would like to read here before you.

The South Dakota Farm Bureau Federation is an organization of farmers, which, we feel, speaks a very sound, constructive voice for South Dakota agriculture.

As a farm organization, we are interested in the full development of our State's resources, and therefore, especially interested in the full and efficient development of land and water, two of South Dakota's basic resources.

We have actively supported the work of the Corps of Army Engineers and the Bureau of Reclamation under the Pick-Sloan plan. This plan, however, is strictly one of engineering. It provides for building of dam for power, flood control, navigation, and irrigation. It does not take into consideration the effect flash floods or heavy rains have upon the land. Their plan merely proposes to catch the runoff from all the tributaries of the rivers and streams in the basin, and channel it into a large structure.

Because Congress approved the Flood Control Act of 1944, which authorized the work of the Corps of Engineers and the Bureau of Reclamation, they have gone ahead with their work, and we feel, at the expense of agriculture.

The agricultural program for Missouri Basin development now before Congress, is very essential if the large expenditures now being made are protected and the full benefit can accrue to the people of the basin and the country. This plan complements the Pick-Sloan plan, and is essential in all its details.

We need to first, hold the water where it falls and allow it to run gradually into the main-stem streams. This procedure prevents soil erosion; it will keep the water clear, so when it reaches the large costly dams, it will be free of sediment. Siltation of dams is a problem the agricultural program will eliminate to a large extent.

The program provides for regrassing, reforestation, the building of small dykes, dams, spreader ditches, etc. We also approve the principle found in the program of farmer participation. We understand that farmers will spend more than the Government under the plan, the Government making it possible to do the work in an orderly and constructive manner.

The United States Department of Agriculture, with its agencies, must have a definite part in the planning and operation of the program. We believe that this will lead to sound and effective development. Haste is necessary, because the engineering phases are already too far in advance. Perhaps some of their planning will need revision in light of the agricultural program.

House Document No. 373 has our full support. It is all inclusive as it provides for conservation and improvement measures; for grassland and cropland; for improvement of forest and forest range lands; for stabilizing measures for small water courses; for aid in irrigation; for drainage on agricultural land; for soil surveys and land classification; for research and investigation; for extension education, and for a credit program.

The time is late, we urge its immediate adoption by the Congress. We urge that an adequate appropriation be made so work can be started at once.

With these remarks I wish to thank you very much.

Mr. LOVRE. Thank you, Mr. Johnson.

Mr. HEIMBERGER. The Izaak Walton League had a rather comprehensive statement which they wanted to present here. The gentleman who was to present it had to leave. He asked it be inserted and filed at this point in the record.

Mr. LOVRE. The statement will be inserted and filed at this point in the record.

STATEMENT AND RESOLUTION FILED BY WILLIAM VOIGT, JR., EXECUTIVE DIRECTOR, IZAAK WALTON LEAGUE OF AMERICA, INC.

RESOLUTION V. ADOPTED BY THE IOWA DIVISION OF THE IZAAK WALTON LEAGUE OF AMERICA, INC., AT ITS ANNUAL CONVENTION HELD IN FORT MADISON, IOWA, ON SEPTEMBER 22, 1951

Whereas the so-called development of the Missouri River Basin is presently being conducted by the Corps of the United States Army Engineers and the Bureau of Reclamation under the Pick-Sloan plan and is being conducted in a manner that has disregarded the best interests of the rural and urban population of the basin; and

Whereas the economic welfare of the entire State of Iowa and of the Nation is being adversely affected by the waste and extravagance of the Pick-Sloan plan; and

Whereas the Pick-Sloan is being instituted in many places without due regard to the economic advisability or the wishes of the people of the Missouri Basin; and

Whereas the completion of the Pick-Sloan plan with disregard for the solemn treaty of rights of certain Indian tribes of the Missouri Basin would be a violation of the democratic principles of our Nation; and

Whereas the proposed preferential distribution of electric power from Federal-owned dams in the Missouri Basin would be socialistic in concept, unfair, and undermining to the American system of private enterprise and contrary to the guaranties of our constitutions: Now, therefore, be it

Resolved, That the Iowa division of the Izaak Walton League of America, in its annual convention, assembled at Fort Madison, Iowa, this 22d day of September, 1951, urge the passage of State and Federal legislation creating a Missiouri Basin watershed board to consist of 1 civilian representative from each of the 10 States in the Missouri Basin, and 1 representative from each of the following Federal bureaus: The United States Department of Agriculture, the United States Fish and Wild Life Services, the United States Corps of Army Engineers, and the United States Bureau of Reclamation; each civilian representative to be nominated by and elected by a majority of the presidents of all the soil-conservation districts in each State. The duty of this board shall be to institute and inaugurate all plans for soil and water conservation in the Missouri Basin, working in harmony with and coordinating with the efforts of the soil-conservation districts and conservation commissions in the basin and that no appropriations be granted by Congress for any power, flood control, irrigation, or navigation projects in the Missouri Basin without the approval by a majority vote of all members of the board; be it further

Resolved, That in the event the Missouri watershed basin board should require the dislocation of certain Indian tribes these tribes be reestablished on lands providing living and recreational facilities equal to or better than the lands being lost to them, with the approval of each tribal council: be it further

Resolved, That any hydroelectric power produced from dams controlled by the Missouri watershed basin board be distributed and marketed by private enterprise.

STATEMENT

To Chairman Poage and members of the House Agricultural Subcommittee sitting at Sioux Falls, S. Dak., November 1, 1951:

Mr. Chairman and gentlemen, this statement is given you in the name of the Izaak Walton League of America, a Nation-wide membership organization devoted to the conservation of the natural resources on which we, as a Nation, must live—our soils, woods and other vegetation, waters, and wildlife.

We appreciate the privilege of appearing before you, and will limit our statement to facts and informed opinion which we hope will help guide you to sound decisions respecting the resources of the Missouri Valley and all other river basins of America. We are making our appearance here instead of having done so at earlier hearings held by this committee for the single reason that because of lack of time we have not been in position to prepare this statement and have it presented previously to you. In the beginning we wish the record to show that ours is a not-for-profit organization which considers the long range public interest paramount, and there is no dollar gain or special privilege motive in what we do or advocate.

Time does not permit us to enter a full scale discussion of all the many aspects of conservation and development in this river basin in which we are interested. We favor integrated planning, in which all resources and all values are adequately considered. We favor fact finding of many kinds, by qualified technicians, and a careful evaluation of all necessary basic data, before we plunge into action programs involing the expenditure of the billions of dollars of money extracted from the wallets of the taxpaying public. We do not believe we have had this kind of fact finding and evaluating up to now.

We recognize that flood control is one of the principal pegs upon which have been hung the arguments in favor of a series of huge dams and reservoirs throughout the Missouri Basin. These arguments, and related discussions, have filled literally thousands of pages of public record. We believe that a rational, economical and proper flood control program for America can be stated in four short paragraphs, as follows:

1. Start at the top of the mountain or hill, at the ridgepole of the watershed and manage or treat each acre of land according to its normal capabilities, so as to slow the melting snows and falling waters to a walk where they come in contact with the earth. This involves contouring, strip cropping, terracing, reforestation, grassing, etc.

2. Put in farm ponds, gully control checks of various kinds, risers at suitable culverts so highway fills act as dams, and other small holding structures that will impound their proportionate share of that which the land cannot ordinarily absorb.

3. Next, put in the types of tributary retarding structures found in the Miami and Muskingum Basins of Ohio. Those of the Miami are perpetually open, so a normal bankful of water can run out at all times; these reservoirs drain quickly, and the land is farmed successfully most years. In the Muskingum the dams intended for flood control may likewise be operated so a bankful runs out when there's a surplus. Such structures, coupled with proper land use, can successfully handle all but the largest floods ever of record in this country—all but the so-called 300-year flood the Army fellows talk about, such as hit Kansas this year.

4. The excess that would overtop the main stream banks in spite of the preventive measures already listed, would then be taken care of through such additional tributary, or main stem impoundments as proper engineering, hydrologic and other basic information showed clearly to be necessary.

We recognize that putting such a program into practice is not as simple as describing it, since it is sensible to bring navigation, irrigation, and hydroelectric power into consideration where they appropriately belong. However, the task is not insurmountable if men and women of knowledge, perspective, honesty, and integrity sit down together to work it out in necessary detail. We are convinced that this kind of approach has not always been had in the past—even in recent past when our friends and neighbors in Kansas and vicinity were suffering hardships and loss from an unprecedented flood. At that time we witnessed a propaganda campaign, dealing in human misery, which Elmer T. Peterson, a prominent Oklahoma writer, termed the deliberate creation of a "panic psy-

chology" in order to speed the construction of reservoirs which would not have halted or truly lessened the damage from that July flood. We invite your attention to a folder of information prepared and distributed recently by the Wildlife Management Institute, of Washington, D. C., which shows the concentration of July rainfall overlaid upon a map of the Missouri Basin. This shows that even if every large reservoir desired by the Army Corps of Engineers had been built and operating, it would not have measurably reduced the flood crests at Kansas City.

We likewise wish to invite your attention to a sheet of information prepared and distributed by the Blue River Study Association, of Randolph, Kans. The point we wish to make in connection with the work of the Blue River Study Association, is that this group of local residents in northeastern Kansas, has, of its own volition, and at its own expense, made a type of analysis of the impacts of the construction of one dam and reservoir, that should have been made in the case of every proposed dam and reservoir, by the Federal dam constructing agencies—the Army engineers, Bureau of Reclamation, and others. So far, the preparation of cost and benefit estimates by those agencies have failed to include the extremely pertinent and important types of information that were assembled by the Blue River Valley residents. It is our considered opinion that no report advocating dam construction should be allowed to be sent to the Congress, as a basis for authorization and appropriation, unless there first has been prepared and delivered to you an analysis patterned somewhat after that which was made by the Blue River Study Association.

That analysis is a devastating indictment of the methods now used by the dam-construction agencies. The Army engineers, recommending Tuttle Creek Dam, on Blue River, told the Congress the benefits from flood control downstream, and from an item labeled "conservation," totaled just under $3,000,000, according to 1947 figures. The Blue River Study Association, after obtaining accurate appraisals and valuations, also based on 1947 figures, has shown that the annual recurring losses to the Nation, in the form of important foods and fibers that would not be produced—because the producing lands would be permanently flooded behind the Tuttle Creek Dam—totaled over $6,000,000, or more than twice the annual benefits claimed by the Army.

In spite of these impressive figures, which to our knowledge have not been denied or refuted by the Army, the Congress was persuaded just a couple of weeks ago to appropriate several hundreds of thousands of dollars for additional study by the Army engineers in the Blue River Valley looking to the ultimate construction of Tuttle Creek Dam.

We have been told the Tuttle Creek Dam will cost upward of $60,000,000. In view of the present rate of unchecked erosion in the Blue River Valley, we consider it logical to declare that the economic life of the dam would not be more than 50 years, that in that length of time it would silt up to a point where it would not be useful to check floodwaters. We point out to you that, while according to the Army's 1947 figures, the aggregate flood control benefits in 50 years would amount to $150,000,000, the aggregate losses, in farm products that would never go into America's pantries and storehouses, would amount to $300,000,000. We have also been told, by what we consider competent authority, that upward of $50 billion worth of dams and other river control structures have either been built in recent years in this country or have been authorized by Congress. We now ask you to project the Tuttle Creek dollar loss outlook Nation-wide. Let us consider that what would happen in the Tuttle Creek Reservoir area may be normal expectancy for the whole country. That is, that an average economic life for all the $50 billion worth of dams and reservoirs likewise is 50 years, and that the dollar loss in foods and fibers Nation-wide would be approximately the same as expected for Tuttle Creek. If this is a reasonable expectancy, and is not what the President has termed "butterfly" economics, then Nation-wide, over 50 years, we may anticipate a cumulative loss totaling in the neighborhood of $250 billion.

Such figures look fantastic, yet we believe they are justified and can be defended. It is regretted that the writer of this statement cannot be present in person to answer any questions in the minds of the members of the committee. However, if it is desired, that supplemental information or answers to questions be submitted, the undersigned will be glad to comply, in Washington or elsewhere, at the convenience of the committee.

We wish to be recorded, in briefer detail, on two related subjects now gaining interest and importance. These are: (1) the small watershed approach to basin development, and (2) the interstate compact approach which has recently

been stressed in some areas. We wish to go on record as strongly favoring the small watershed conservation and development program, as typified by the Brandywine Valley Association operation in Pennsylvania and Delaware, and that of the Muskingum Watershed Conservancy District in Ohio. We are favorably interested in the joint Federal and local operation that apparently is envisioned in the Salt-Wahoo watershed of eastern Nebraska. We urge that efforts may be made to speed up this program so its potentialities for good may be properly estimated and its good qualities applied in other smaller watersheds all over the country. We also are interested in seeing whether integrated operations of a network of associations of smaller watersheds can be utilized as substitutes for, or to supplement, large basin-wide programs carried out exclusively by the Federal Government.

We believe there may be excellent qualities found in a further exploration of the possibilities of interstate compacts for river basin conservation and development programs. However, we fear the recent preliminary draft of such a program, prepared by the Council of State Governments at the request of the Missouri River Basin States Committee, has defects which should be corrected before we can give this approach our approval. One specific portion of that proposal which we believe undesirable, is that which would give a single Federal representative on the governing body a weighted vote equal to those of all the 10 proposed representatives of the States in the Missouri Basin. This is a subject which should have much discussion, and it is again regretted that the writer cannot be present to answer questions at this time. He will be glad to do so at the future convenience of the committee, if that is the committee's wish. Summing up, the Izaak Walton League of America advocates the following:

1. A simple 4-point flood-control program as outlined at the start of this statement, properly and sensibly carrying with it necessary, and economically, socially, and biologically sound, accessory operations.

2. A greatly speeded-up program of small watershed conservation and development, in which the power and moral worth of individual initiative and local group enterprise is felt, to precede and in some measure determine the necessity for, large-scale Federal or Federal-State programs.

Mr. LOVRE. Mr. Olaf Blake.

Mr. BLAKE. Mr. Chairman and members of the committee, I am also interested in flood control on the Vermillion River. I live in Centerville and am a farmer along the Vermillion.

TESTIMONY OF OLAF BLAKE, CENTERVILLE, S. DAK., SOUTH DAKOTA STATE REPRESENTATIVE, COUNTY COMMISSIONER OF TURNER COUNTY, AND FARMER ALONG THE VERMILLION RIVER

Mr. BLAKE. Having lived in the area between Davis and Centerville on the Vermillion River about 64 years, I have had an opportunity to observe the damage from flooding on our good farm lands in that area and having served the State as a State representative six terms, had a chance to observe the problems in other areas of our State.

It appears to me that our problem is too great for any of our local organizations to handle without the assistance of our Federal agencies provided they are supplied with additional funds to do the job.

We have been trying to control the flooding on our individual farms and forgetting that what we do for ourselves may be detrimental to our neighbors, either up or down the river. Therefore, we need an over-all survey of the entire watersheds of the rivers in question with a long-time program worked out to be put on our lands through our local organizations assisted by the existing Federal agencies.

Further practices of soil conservation, including terracing, contouring, stock-water dams, and other soil- and water-saving practices are stressed in the upland areas.

In this area, from 4 miles north of Davis to 2 miles south of Centerville—

Number of farms involved, 56; number of acres involved, 1,640; dollar loss, $164,000; other losses, $50,000.

How often do floods occur?—spring and summer? Are they due to spring runoff? Yes. Excessive rainfall? Yes.

I recall one year the Vermillion River flooded seven different times during the crop-growing season.

The more recent floods have occurred during the following years:

1932: Spring flood.

1944: Five different floods from the northern area during the summer months, and the American Red Cross extended considerable flood relief.

1946: Another flood was experienced and the Red Cross was again called on for relief.

1947: This area along the Vermillion River was again flooded, including the town of Davis, S. Dak. The Red Cross was again administering flood relief.

1951: This area was flooded two different times, including the town of Davis, S. Dak. One flood in the spring, and the second flood during the crop-growing season, and the Red Cross administered considerable relief.

In recent years we have practiced soil conservation, which includes terracing; however, drainage of upland ponds taxes our rivers beyond their capacity.

If any Federal assistance can be administered in the above-mentioned catastrophes, it will be much appreciated.

The floods mentioned have done an enormous amount of damage to our farms, crops, roads, bridges, and fences, and I have observed every time we get a flood our farm lands become infested with all kinds of noxious weeds, besides causing a lot of added expense, suffering, and hardship to our citizens.

The erosion and runoff upstream is what is causing our damage. North of this area I am referring to, the river seems to have more flow, a swifter current. It seems to take care of the excess water in pretty good shape, but in this area that I represent it is more level, flat land. There really isn't much runoff, to speak of, and that is led into the stream, but it is the water from up above that is most detrimental in our case. The floods mentioned above had done an enormous amount of damage to our farm crops, roads, bridges, and fences.

If we can be considered to receive some kind of Federal assistance in any shape, form, or manner, it will be greatly appreciated.

Thank you.

Mr. LOVRE. Due to things that have been demonstrated here this morning, we have made a change in our plans. Originally the hearings were to start at 10. We thought we would have quite a few witnesses here; so, we advanced the time 1 hour, to 9, with the understanding at that time that the hearings would be concluded at 1:30. It is apparently impossible to do that. We want to hear each and every one that is interested; so, here is what we propose to change in our plans. We are going to adjourn at 1 o'clock. We will reconvene at 2:30. We will stay here until tomorrow morning, if necessary, in order to make a record of everyone that has got anything to say with reference to this most important subject now under consideration.

So, at 1 o'clock we adjourn and reconvene at 2:30. From 2:30 we stay until everyone has been heard who is desirous to testify.

Our next witness will be Mr. I. B. Johnson, of South Dakota State College. Mr. Johnson.

STATEMENT OF I. B. JOHNSON, DIRECTOR, AGRICULTURE EXPERIMENT STATION, SOUTH DAKOTA STATE COLLEGE

Mr. JOHNSON. I am I. B. Johnson, director of the agricultural experiment station, South Dakota State College, and representing the agricultural experiment-station directors of the 10 Missouri River Basin States. In offering this testimony, I do so as an officer and director of this association in the 10 States in the basin. It is more inclusive than our own State, and offered on behalf of all of the extension directors.

I want to endorse what Mr. Anderson had to say regarding the need for additional research and education in the development of the agricultural program in the Missouri Basin. This program needs to be stepped up, as has been emphasized by the previous speakers. Much of the research necessary to the success of the development has not yet been done. There are areas that need a great deal of research to forward the Missouri River development program.

In the development of the great river system lies a major opportunity for increasing the wealth and power of the Nation. The Missouri River is the country's largest single river. It flows from 10 States, drains one-sixth of the country's total area and one-fourth of its farm land. The development of this vast and richly endowed basin for the continuing good of the people is a great task to which we, as a Nation, must devote energy and scientific skill. We conceive research to be a necessary means toward this high purpose, a means to inspire, plan, and guide the agricultural development.

Secretary of Agriculture Charles F. Brannan called attention "to our farms and forests, as the basic units in conservation, where we should start in—

1. Building a defense against withering drought;
2. Easing the challenge of devastating floods;
3. Arresting erosion, thus conserving our topsoil and reducing siltation downstream;
4. Replenishing our soil fertility; and
5. Making better use of the water in strengthening our agriculture and our municipal and industrial water supplies."

He asserted that "the knowledge distilled from many years of research is one of the cornerstones of the program recommendations for the basin," and stressed that "our research is still far from finished."

WHY AN ACCELERATED PROGRAM OF RESEARCH IS NEEDED

Much of the research necessary to the success of such development has not yet been done. Therefore, there is an urgent need for a great deal of research on Missouri River Basin development problems. Such a research program must deal with conditions and factors related to the whole economy of the basin. However, we are concerned here with research in the welfare and improvement of agriculture, its renewable natural resources, and its people.

This need for agricultural research traces principally to certain natural and social characteristics of the Missouri Basin which differ from those of other areas where large-scale reclamation developments have been instituted. These characteristics include the following:

1. This area is more humid than those in which previous major irrigation developments have occurred. Over much of the eastern half of the basin the precipitation during normal growing seasons is sufficient to mature crops without irrigation. But there are frequent years when the total precipitation or its distribution are inadequate and there are partial or complete crop failures. A great deal must be learned concerning the type of irrigation needed under such conditions, and the amounts and frequency of water application, proper drainage, and their effects on various crops.

2. Partly as a result of the precipitation, but also for geologic reasons, the soils of the Missouri Basin differ from the alluvial soils in arid climates where previous major reclamation developments have occurred. The Missouri Basin soils, particularly those in the central and eastern areas, are glacial in origin, have developed distinct profiles which will be distributed by leveling operations with consequent effects on productivity, and have an irregular topography which will pose problems in water distribution and drainage. More study is needed on these differences.

3. The lands in the basin already are established in productive livestock patterns. Any accelerated development must come by superimposing new patterns on, or substituting them, for the old. This is more complicated than the development of new farms from arid lands, and many of the techniques to be needed in the process have not yet been worked out.

4. These lands are now in private ownership for the most part. Development of irrigation will bring many problems, physical and social, in changing large, block-type dry-land farms to smaller, irregularly shaped, irrigated lay-outs. We have not previously faced such transitions on a large scale and are just beginning to study the problems and possible answers.

5. Public institutions and cultural patterns are established in the basin. The changeover to more intensive agriculture and settlement with many more farming units added give rise to new problems and difficulties which should be foreseen in advance and which can be done only if sufficient study is given to them.

The foregoing characteristics emphasize the need for an immediate and comprehensive accelerated agricultural research program in a region where large sums of Federal funds are being spent and will be spent for action programs.

WHAT IS THE ACCELERATED RESEARCH PROGRAM

The soil-survey and land-classification program outlined on pages 126 to 134 of House Document 373 and the program of research and investigations described on pages 135 to 153 of the same document have been carefully planned and prepared jointly by the research men of the 10 State agricultural experiment stations in cooperation with the research men of the United States Department of Agriculture. There was created a Missouri Basin Regional Research Committee which over the past 3 years has been active in development of coordin-

ated programs of agricultural research particularly concerned with problems of the area.

The program of research and investigations as outlined in House Document 373 planned and projected for a 10-year period instead of the 30-year period indicated for the other agricultural programs of the basin. The reason for this being that it is difficult to foresee the more pressing agricultural problems requiring research for more than a 10-year period. Toward the close of the 10–year period the research needs will be reappraised and then proposals will be made for the continuation of the needed research and the initiation of new research as current problems of the basin may demand at that time.

The research program is designed to furnish the factual basis for an accelerated program of land, forest, and water development and to assure its full completion with the least use of costly trial-and-error methods. If the Government is to make a $3 billion investment of public funds, and if farmers and ranchers are to invest the equivalent of $5 billion in labor and financial outlay for this development program, it would seem wise to conduct the necessary research to enable the farmers, ranchers, and the public to get the most for the funds expended.

By way of illustration, the following 10 problem areas, not necessarily listed in the order of importance, and certainly not complete by themselves, emphasize the need for sound facts upon which to base certain development activities of the basin program.

1. *Watershed management, including the conservation of soil and water on the ranges and in the forests.*—Research should test the different combinations of management practices to determine their effect on water yields, soil erosion, and range and forest production; determine the most desirable grazing practices so as to maintain and improve the forage resources; and ascertain the best means of reducing erosion by wind, gully, and stream bank.

2. *Conserving and improving the fertility of the dry-land areas of the Plains.*—While much has already been learned, much remains to be learned as to the best means of maintaining the productivity of the cultivated lands, which under common usage are still steadily declining in organic matter. Much is to be learned about the kind and amounts of fertilizers to use. More satisfactory rotations containing grasses and legumes that will maintain the organic matter are necessary. Cultural methods that will best utilize the limited rainfall and at the same time prevent wind and water erosion are essential problems to be attacked.

3. *Legume and grass-seed production.*—At present, seed production of grasses and legumes is one of the most uncertain and hazardous farm enterprises. The reasons for low seed yields are not clearly understood. It is well known that insects, both beneficial and harmful, play important parts. Plant diseases have a decreased productive effect. The lack of plant food, inadequate information as to the most suitable cultural practices, and weed-control practices play important roles. The problem is a most complicated one and requires a coordinated research program involving the study of the several factors that affect seed production. The importance of producing the needed seed supply of hardy grasses and legumes is further emphasized by a national crop-adjustment program and the fact that a balanced perma-

nent American agriculture requires about 25 percent of the cropland acreage in grass and legumes.

4. *Insecurity of tenure and income.*—Occasionally in the Plains area of the basin, weather extremes and price fluctuations have created instability of income and tenure. More information, therefore, is needed about adequate feed and capital reserves for periods of drought, crop insurance, methods of variable payments under mortgages or rental contracts, and adjustments to avoid tax delinquencies.

5. *Runoff from watersheds and sedimentation.*—Reliable information on the runoff characteristics of small agricultural watersheds of the basin is practically nonexistent. Information is needed as to the efficiency of the different land treatments, practices, and structures for reducing erosion and runoff, in order to conserve the soil and moisture on the upper reaches of the watershed, and to aid in the prevention of floods and extreme sedimentation in the lower portions of the basin.

6. *Problems created by flooding land in reservoir sites.*—What will be the best uses for lands that are flooded occasionally? How can the finances of local governments be adjusted? What procedures are most acceptable in relocating the displaced farmers? These questions from the field bring out some of the problems of this area.

7. *Water, soil, and plant relationships in crop production on irrigated lands.*—The introduction of irrigation into the central and eastern parts of the Missouri Valley will create problems which have not been encountered in the previous irrigation projects in the United States. Heretofore, most of the irrigation has been confied to alluvial soils in arid climates with little soil-profile development. Land leveling of such soils has not impaired their productivity as seriously as it will on the more fully developed soils in the subhumid climates, especially in the central and eastern parts of the Missouri Basin, where irrigation is not generally practiced. A large part of the proposed irrigation is on soils derived from glacial material, where irregular or "pot hole" topography will make distribution of water and surface drainage difficult.

Normally, the total precipitation during the growing season is sufficient to mature crops without irrigation. Therefore, the amount of water required for irrigation and its seasonal distribution is of great importance, since it will supplement the natural precipitation. As surface and ground waters contain variable amounts of salts, the problem of water quality becomes an extremely important one in avoiding the formation of saline and alkali soil areas.

Many of the soils which are proposed for irrigation in the Missouri Basin are not well drained. Adequate drainage is essential to prevent salt accumulation and to reclaim saline areas. Problems of salinity and alkali control will be further aggravated by impermeable subsoils and by the salt-bearing nature of some of the underlying geological materials, such as the Pierre shale.

Research in water, soil, and plant relationship is essential in order that the best cropping systems, irrigation and soil-management practices, and methods of controlling drainage may be determined before costly changes are made in the farming practices of the area.

8. *Sizes and types of farms likely to succeed under irrigation.*—Sizes and types of farms, farm practices, and uses of water need to be determined to fit the subhumid conditions. Many experiences in

irrigation farming in the arid and semiarid areas cannot be applied to subhumid areas, which are already being farmed in large units and with mechanized equipment. Income potentialities influence the size of population which can be supported in the area.

9. *Plant-insect and plant-disease problems.*—While these problems now confront the farmers of the basin and progress has been made for their control, nevertheless both will become more serious as the irrigated areas are developed and crop patterns changed, and an accelerated research program regarding their control becomes all the more complicated because of the need for protecting the pollinating insects in the new irrigated areas where crop production will become intensified.

10. *Market outlets.*—Because of its size, prospective production from the Missouri Basin development might well disrupt the market for established production areas unless it is planned in the light of its competitive and complementary relationships with other areas. Research should include a careful appraisal of market prospects, and facilities such as transportation, storage, and warehouse facilities, and modern low-cost processing facilities, with a view to aiding producers and marketing agencies in moving their products into consumer channels.

A COORDINATED AGRICULTURAL RESEARCH PROGRAM IN THE MAKING

The Missouri Basin Regional Research Committee, in cooperation with the Field Committee of the USDA, outlined detailed coordinated research projects on the problems it considered of first importance for the basin-development program. These projects include—

1. A complete soil survey of the land in the basin with a detailed survey of the more productive cropland and of the land proposed for irrigation.

2. Water, soil, and plant relationships in crop production on irrigated lands in the Missouri Basin, involving—

A. Development of water application on methods best suited to lands in the Missouri River Basin.

B. Water requirements for irrigation in the Missouri Basin States.

C. Factors affecting the drainability of land (including permeability of the soil and substrata) and their relationship to land classification for irrigation and the design, construction, and operation of drains.

D. Crops, cropping systems, and tillage practices.

E. Soil management and fertilizers.

F. Salinity control and reclamation of saline lands.

3. Factors influencing seed production of legume and grass species and varieties adapted to range, irrigated, and nonirrigated lands of the Missouri River Basin.

4. Investigations of effects of land use and farming practices on runoff and sediment production from watersheds of various sizes.

5. Economic projects consisting of—

A. Economic problems of watershed management and land conservation in the Missouri River Basin.

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B. Income potentialities of farming and sizes and types of farms most likely to succeed in the areas to be irrigated.

C. Economic problems of irrigation development and settlement and problems of withdrawing reservoir sites from agriculture.

D. Inter- and intraregional competitive position and marketing facilities for the commodities likely to be produced in new irrigation project areas.

E. Farm capital requirements, credit needs, and facilities in the Missouri Basin.

F. Stabilizing tenure and income.

G. Estimate of acreage, yield, and production of crops; estimates of livestock numbers; and construction of indexes of prices received and paid by farmers and ranchers in the Missouri Basin.

Certain limited portions of this research are already being conducted within the States, between the States, or in cooperation with the United States Department of Agriculture. The importance of the program is recognized locally and the problems are being tackled with what relatively inadequate funds and facilities there are available. To illustrate:

1. The basic soil surveys have been expanded recently in the Missouri Basin in order to make an inventory of our soil resources and gather factual information for intelligent planning of soil and crop production practices.

The present soil studies in North Dakota have shown that the soils in the Missouri-Souris area are probably unsuitable for irrigation. This example illustrates how agricultural research can help to avoid waste of public funds and furnish data for the sound planning of desirable and profitable developments.

2. Agricultural economists from the Montana, North Dakota, South Dakota, and the Nebraska Agricultural Experiment Stations and the United States Department of Agriculture, cooperating voluntarily and informally are attacking a project entitled "Income Potentialities of Farming and Sizes and Types of Farms Most Likely To Succeed in Areas To Be Irrigated."

3. Research on water, soil, and plant relationships in crop production on irrigated lands in the Missouri Basin has been started in a small way with the limited funds and facilities that have been made available by the various States, the Bureau of Reclamation, and the United States Department of Agriculture.

FINANCES REQUIRED TO CONDUCT THE BASIN RESEARCH PROGRAM

The research conducted in the three problem areas should be stepped up perceptibly in order to have the necessary facts at hand to guide the agricultural development plans for the basin. It is the opinion of the directors of the agricultural experiment stations in the basin States that the funds requested in tables 29 and 30, page 133, and tables 31 and 32 on pages 152 and 153 of House Document 373, are not excessive and should be provided now so that the Federal and State agricultural research agencies could effectuate the program of research for the guidance of the basin development agencies and the use of the farmers and ranchers occupying the lands in the basin.

The cost of the research program for the 10-year period, including installation and operation costs, amounts to approximately $64,000,000 or 0.8 percent of the cost of the agricultural development program. Assuming that the total cost of the research program might range from $125,000,000 to $150,000,000 for a 30-year period, and adding to these estimates the cost of the soil-survey program, the entire cost would be between 1.8 percent and 2.1 percent of the agricultural development program cost.

Communications from the directors of the agricultural experiment stations of the land-grant colleges in the Missouri Basin States indicated that for the fiscal year which ended June 30, 1950, the following funds were used for research on the Missouri Basin problems:

State funds used	$491,730
Federal grant funds used	250,660
Total	742,390

The amounts used for the fiscal year ending June 30, 1951, were quite similar to the foregoing. They also indicated that requests would be made of their State legislatures for additional State appropriations amounting to approximately $125,000.

The Missouri Basin States, like other groups of States, are lacking in coherent financial organizations for a cooperative enterprise of this dimension; they are unequal in wealth and variable in enabling laws. For these reasons, and because the development of the Missouri Basin must be a regional undertaking, the United States should provide the major part of the money needed to carry out the research fundamental to basin development, with the basin States themselves contributing according to their individual means and responsibilities.

For successfully carrying out the agricultural features of this great enterprise, the strength and resources of the Missouri Basin States and their land-grant colleges must be combined in a fair and true partnership. We believe:

1. Of the money appropriated by the Congress for this agricultural research program, an adequate amount (approximately 50 percent) should be made available directly to the Missouri Basin States for the use of their land-grant colleges in carrying out research called for by the program, and the remaining amount of the money so appropriated should be available to the United States Department of Agriculture for participation in the program. A breakdown of the total allotment to all research projects under the program should be decided by mutual agreement between the United States Department of Agriculture and representatives of the land-grant colleges of the Missouri Basin States.

2. The research projects to be supported by funds made available under this program must be jointly planned by the States and the United States Department of Agriculture.

Summarizing, the Nation is spending, or planning to spend, billions of dollars on the development of the Missouri Basin and its agriculture. For more adequate planning and guidance of that development, a fully adequate amount of funds should be invested in agricultural research. The need is recognized by the Basin States and has resulted in the coordination of efforts to develop an adequate program of research to meet the new as well as the present intensified problems. Additional Federal funds are needed, if the required re-

search program is to be a reality. If we are to secure the essential facts in time to be used for the planning and guidance of the agricultural development program, such funds should be provided immediately.

Mr. LOVRE. Our next witness will be Mr. James R. Smith, of the chamber of commerce, Yankton.

STATEMENT OF JAMES R. SMITH, MANAGER, CHAMBER OF COMMERCE OF YANKTON, S. DAK.

Mr. SMITH. Mr. Chairman, gentlemen of the committee, Senator Mundt, Governor Anderson, and gentlemen, my name is James R. Smith. I am manager of the chamber of commerce at Yankton, S. Dak. I have been a student of plans for the beneficial development in the Missouri Valley for the past 9 years and have appeared before numerous congressional committees and groups in the valley in behalf of that subject.

The organization which I am representing here today, composed of 430 business and professional men and women in Yankton, has for more than 30 years been a leader in urging that the Missouri River and its tributaries be turned from monsters which periodically flood our farms and cities into servants of mankind. I am also speaking for farmers in our southeastern corner of the State.

It is, indeed, fortunate that by the same steps we take to protect our upstream farms we can materially lessen the danger of floods to areas downstream.

The program for the development of the Missouri Valley, as authorized by Congress in the Flood Control Act of 1944 and as envisioned by us who live in the valley, is primarily one of integration. Each Federal agency responsible for certain phases of the authorized plan is at the same time contributing to the ultimate success of the over-all plan. This coordination of activity means that in the foreseeable future we will solve our flood problems, preserve our farm lands and at the same time upgrade our economy through the many secondary benefits which will also come about, such as irrigation, electric power, river navigation, and recreation.

The Corps of Engineers is responsible for dams and reservoirs upstream and dikes and levys downstream. The Bureau of Reclamation is responsible for work on certain tributary streams, for irrigation, for the distribution of power.

You gentlemen today are interested in the third great facet of the Missouri River development program. When the program proposed by the Department of Agriculture was first submitted, we who have been studying and fostering the over-all plan were gratified. That plan filled in and made complete the greatest program for the conservation of land and water ever conceived by men.

There is no conflict between flood control and soil conservation. Rather the two go hand in hand. The problem of flood control originates on the individual farm. Therefore soil conservation and the land-management practices must play an important part in the solution of our flood problems.

The Corps of Engineers and the Bureau of Reclamation cannot do the whole job of flood prevention. Neither can soil conservation practices do the whole job. The Soil Conservation Service admits that.

The ultimate solution to our flood and land-management problems will result from the closely integrated function of the Corps of Engineers, the Bureau of Reclamation, and the Department of Agriculture.

With an expanded soil-conservation and land-management program in the upland areas to slow down the water; with the Bureau of Reclamation and the Corps of Engineers impounding water in the main streams in the valley and with the secondary benefits from that over-all program all worked out we feel as though, finally, the full conception has been realized and planned for.

Today, then, we should like to urge that the Agriculture Department's part of the over-all program as incorporated in House Document 373 be authorized by Congress and implemented by sufficient appropriations in order to keep that phase of the over-all program moving along at the same rate as the other parts of the coordinated plan.

Congress has realized the importance of our 10-State area, comprising one-sixth of the land area of our country. The whole river program has been about 25 percent completed since authorized in the Flood Control Act of 1944.

During the past week, in preparation for this hearing today, there have been several meetings of farmers in the southeastern corner of South Dakota to discuss their own problems and to prepare for today's hearing. I've met with them and they have a pretty clear idea of how the Missouri River plan can be translated to apply to their own individual problems in their own small watersheds.

After a series of such meetings they asked if I would outline, in general terms, their attitude toward flood-control, land-management, and drainage problems. Then several of them, each representing farmers in his own area, would like to tell you briefly about their own problems.

I don't want to take any more time than is necessary but I would like to outline to you gentlemen our specific situation in southeastern South Dakota.

In Yankton, Clay, and Union Counties, there were this year, approximately 115,000 acres of nonproductive land. This unusually fertile land is some of the richest cropland in America. These acres did not grow any crops at all this year because of high waters and residual waters which were left lying on the land after the main floods had receded. Therefore we are talking about many million dollars in 1951 crop loss alone. It was the consensus at these farmer meetings that the following problems existed:

1. There are not enough good soil conservation practices in use in upland areas.

2. There are not enough minor flood control structures, in fact I don't think there are any, to hold back tributary floods during the spring thaw and after flash rains.

3. The silt load caused by poor upland soil practices has limited the runoff capacity on the lower streams to such an extent that much unnecessary flooding occurs.

4. There are not enough drainage ditches to relieve the pressure of high residual water levels.

In the lowlands the problem does not belong entirely to the landowners in those areas. Upland landowners are permitting excessive runoff of water and silt. Besides contributing to the ruination of

their own land they are contributing to the problems downstream. Upland owners are therefore increasing the cost of draining the lower areas although at the present time there is no way by which they can or do contribute to draining those areas.

We in the southeastern part of the State suggest the following specific remedial measures that will be necessary to permanently protect the farmlands in southeastern South Dakota. We think that the same measures are applicable elsewhere in the Missouri Valley. They are as follows:

1. There should be an over-all survey of the watersheds of the lower James and Vermillion Rivers and other tributary streams.

2. The agricultural phases of the over-all Missouri River development program should be immediately authorized by Congress. These should then be implemented by adequate appropriations.

That program would provide for an expansion of the program of the Soil Conservation Service. It would provide for more contour farming, terracing, and other good land-use practices. Such expansion would also provide for a speed-up on the construction of minor flood-control, structures, such as had been done on the Little Sioux in Iowa and the Washatau project in Oklahoma.

The land conservation program of the Forestry Service would also thereby be implemented to provide wooded acreages on the farms and ranches in the area.

The program of the Production and Marketing Administration with incentive payments and other aids to farmers in getting soil conservation practices established would be accelerated.

3. Some method should be worked out to provide for Federal assistance in the construction of urgently needed drainage ditches to drain the fertile downstream low-lying farmlands which have been rendered nonproductive because of residual water.

4. The siltation of the James, Vermillion, and Sioux Rivers should be cleaned out by dredging.

5. Some consideration should be given to providing emergency funds to give temporary protection to these farmlands during this time of national emergency when the production of food is so vital to the economy and defense effort of our country.

Those are the five things we have worked out as being needed.

As I said, there are a group of gentlemen here with me and with your permission may I call them by name and have them stand up?

Mr. LOVRE. I would be very happy for you to do that. I think some may even have been listed on here.

Mr. SMITH. First I would like to introduce Mr. Ernest Johnson, State representative from Yankton County.

STATEMENT OF ERNEST JOHNSON, STATE REPRESENTATIVE, YANKTON COUNTY

Mr. JOHNSON. I haven't a great deal to add to what has already been said. I am a farmer living down in the flooded area. The problem is too much for the landowners to take care of themselves. We have a flood problem there. The water comes out of the hills and floods, in Yankton County, 70,000 acres. We also have a soil problem there. The soil is carried from the hills and deposited in our drainage

ditches, consequently the water collects down in our territory to such an extent that it raises the water level on our land so high it makes a lot more land nonproductive than that that is flooded. I think that down in our territory we are interested in getting a project set up on the Vermilion River and possibly on the Jim River, a similar project that has already been set up on the Little Sioux River.

I think that is all I have to say; thank you.

Mr. SMITH. I would like to introduce Herman Walraven.

STATEMENT OF HERMAN WALRAVEN, REPRESENTING A COMMITTEE OF LANDOWNERS

Mr. WALRAVEN. I have prepared a little statement I would like to read:

To the House of Representatives, Agricultural Subcommittee:

I am Herman Walraven of Meckling, S. Dak., chairman of the undersigned committee, who were chosen by a group of landowners to represent them in a drainage problem.

Jim Smith, the secretary of the Yankton, S. Dak., Chamber of Commerce, called a meeting of farmers from the lower watersheds of the James, Vermilion, and Sioux Rivers on the subject, Drainage and Soil Conservation in Connection With Missouri River Development. It was found that 115,000 acres of good farm land in the counties of Union, Clay, and Yankton were nonproductive, due to flooding and lack of proper drainage, including thousands of acres having a partial crop loss for the same reason, and the greater part of this area, even under favorable conditions, will not raise a crop next year.

It was agreed at this meeting that the following needs should be provided:

1. Soil- and water-conservation practices on upland areas.
2. Minor flood-control structures, constructed with Government aid.
3. Dredge the silt from near the mouths of the James, Vermilion, and Sioux Rivers.
4. Proper drainage of low areas.
5. Emergency assistance on the above problems to be given by the United States Government.

Clay County has 40,000 acres with a total crop failure, or a quarter of a million dollar loss in our immediate area, lying between Gayville and Vermillion on the south side of Highway No. 50. This loss of income effects our economy all the way through our tax structure from the local schools, township, town, city, county, State, and national. Under these strenuous times, none of us can absorb these losses for any length of time, and to those in this area who are fortunate and own the better farms but oppose this proposed improvement fearing that some of the drainage laterals may be laid out following their property lines, they should realize that the tax equalization boards may be asked to shift part of the tax burden from the lesser productive farms to the higher productive ones, and thereby increase their tax load—this may be avoided by them simply giving their moral support to the proposed project.

The flooding in this area is partly caused by the construction of roads without the proper amount of culverts, and the construction of State Highway No. 50, which blocks the natural water drain at the town of Meckling, partially filling all the basements in the town with seepage water and contaminating most of the wells causing grave health hazards. It also causes the water west of town to back up, flooding several thousand acres of cropland.

A neighbor of ours purchased 160 acres of unimproved farm land 2 years ago, viz: the SE¼ of section 21, township 93, range 53—he built a house of cottonwood lumber with about 6-foot sides and boards lying on the ground for a floor—water has stood in this house much of the time this summer. He lost part of his chickens because they couldn't get off the roosts; finally, he sold what he had left.

This man has a wife and a daughter in the eighth grade—he hasn't raised a kernel of grain in the 2 years that he has lived on the place. We brought this instance to your attention to show that there is some human suffering taking place through no fault of their own.

To remedy this situation, we have circulated a petition with about 75 percent of the landowners of this area signing, petitioning the ditch board of Clay County to ask the Soil Conservation Service engineers to survey this area—the above action took place about 2 months ago—this is in accordance with the ditch laws of the State. The Soil Conservation Service informs us that it does not have the engineers available, nor the funds to hire any to get the job done this fall.

It is imperative that we get the surveying done and the yardage figured this fall so we can get the contractors to bid on the job, get the assessments on each 40 acres figured, have assessment, hearings, get the final petitions signed by at least 51 percent of the landowners of the ditch district and get the contract let so that the contractor can start work in the spring, providing some good neighbor on higher ground does not serve a court injunction against the project—if not, then it may be possible to raise some crop next year.

(Signed) HERMAN WALRAVAN, *Chairman.*
L. L. ZELLER, *Secretary,*

(Committee members: Fred Sealey, Carl Berglund, Buel Burton, Lloyd Johnson, L. H. Ahrendt.)

Mr. LOVRE. Thank you, Mr. Walraven.

Mr. SMITH. I would like to introduce Martin Swendt, of Volin.

Mr. SWENDT. Mr. Chairman: I am a small landowner. I had a total loss of our crop this year. The land is still wet. What I have to recommend has already been mentioned by our spokesman, Mr. Smith. Thank you.

Mr. SMITH. Mr. Louis Arndt.

Mr. ARNDT. The points have all been covered so I have nothing to say.

Mr. SMITH. Mr. Maynard Christenson.

Mr. CHRITENSON. As a farmer from Clay County I would like especially to recommend the five measures which Mr. Smith pointed out at the end of his statement.

Thank you.

Mr. SMITH. Mr. Fred Seeley, Vermillion.

Mr. SEELEY. I don't believe I will take any of your time. Mr. Walraven has stated my views very completely.

STATEMENT SUBMITTED BY V. G. ADAMS, AKRON, IOWA

Subject; Union Creek.

V. G. Adams of Akron, Iowa, gives the following information on the damages caused by the floodwaters of Union Creek on the bottom land. This does not include the serious erosion damages by water in the watershed in the hills.

Having carefully studied the report of Elmo Fletcher and finding it as accurate in my estimation as is possible, I am filing this report to verify his estimate. The two farms owned by us paid about one-third of the $12,000 mentioned in his report.

Estimated damages to crops:

Before 1944 (per year averages)	$60,000
1944 (3,500 acres)	$250,000
1945–49 (protected by new channel and dikes constructed in fall of 1944	None
1950	30,000
1951 (1,600 acres)	100,000
Crops grown in this area are:	*Percent*
Corn	60
Wheat	25
Oats	10
Pasture and hay	5

In 1951 the crop damages occurred on 17 farms. In addition to crop damages there was estimated damages of $1,000 to dikes and $2,000 to roads. Silt deposit

up to 6 feet deep damaged 100 acres and erosion removed as much as 2 feet of topsoil on 6 acres.

In the fall of 1944 dikes and a channel three-fourths of a mile in length were constructed at a cost of $12,000. This channel has been silted full so the $12,000 improvement is of no value now.

A 100-acre lake has been so badly silted that its value for recreation and flood-control reservoir is practically nil. Union Creek is responsible for much of the silt deposited in this lake also. This lake had a depth of 20 feet, but now only a small area has a maximum depth of 10 feet. Some areas are actually higher than the adjacent fields.

In order to make a road usable again a large bridge will have to be constructed at an estimated cost of $30,000.

Most of the land is not fenced because of the high flood damages to fences.

The silting problem has increased in the late years, probably because of loss of organic matter in the soil and of increase in acreage of cultivated land in the entire watershed.

Silt deposits and construction of dikes and roads have changed the location of the creek channel several times.

STATEMENT SUBMITTED BY ELMO FLETCHER, AKRON, IOWA

UNION CREEK

Elmo Fletcher, of Akron, Iowa, gives the following information on the damages caused by the floodwaters of Union Creek on the bottom land. This does not include the serious erosion damages by water in the watershed in the hills.

Estimated damages to crops:	
Before 1944 (per year average)	$60,000
1944 (3,500 acres)	250,000
1945–49 (protected by new channel and dikes constructed in fall of 1944)	None
1950	30,000
1951 (1,600 acres)	100,000

Crops grown in this area are:	*Percent*
Corn	60
Wheat	25
Oats	10
Pasture and hay	5

In 1951 the crop damages occurred on 17 farms. In addition to crop damages there was estimated damages of $1,000 to dikes and $2,000 to roads. Silt deposit up to 6 feet deep damaged 100 acres and erosion removed as much as 2 feet of topsoil on 6 acres.

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A 100-acre lake has been so badly silted that its value for recreation and flood-control reservoir is practically nil. Union Creek is responsible for much of the silt deposited in this lake also. This lake had a depth of 20 feet, but now only a small area has a maximum depth of 10 feet. Some areas are actually higher than the adjacent fields.

In order to make a road usable again a large bridge will have to be constructed at an estimated cost of $30,000. Most of the land is not fenced, because of the high flood damages to fences.

The silting problems has increased in the late years, probably because of loss of organic matter in the soil and of increase in acreage of cultivated land in the entire watershed. Silt deposits and construction of dikes and roads have changed the location of the creek channel several times.

STATEMENT SUBMITTED BY J. H. JULIAN, VERMILLION, S. DAK., OCTOBER 30, 1951

I have read the above statement. I think Mr. Fletcher is entirely correct and possibly a bit conservative in the acreage damaged. I have had personal contact with this situation for more than 35 years, and know the conditions well.

Mr. LOVRE. I am very happy to announce that the Governor of the State of South Dakota has arrived and we will now hear from the Honorable Sigurd Anderson, Governor.

STATEMENT OF HON. SIGURD ANDERSON, GOVERNOR OF SOUTH DAKOTA

Governor ANDERSON. Chairman Lovre, members of the committee, Senator Mundt, my name is Sigurd Anderson. I am Governor of South Dakota, and a member of the Missouri River States Committee, and a member of the Missouri Basin Interagency Committee.

On behalf of the people of South Dakota I would like to thank the members of this committee for coming to the State of South Dakota. Ifeel that South Dakota is highly honored to have you here and I want to assure you we appreciate the fact that you came to this State and enabled the people of South Dakota to see what Congressmen look like so it won't be necessary to go to Washington to meet them there. It is a case of Mahomet going to the mountain in reverse. The mountain came to Mahomet. We appreciate that.

I do not have a prepared statement. I would like to take a little bit of your time to speak of some of the ideas I have in connection with the matter you are conducting hearings on today.

You probably have been told a thousand times that the Missouri Basin program is the greatest ever undertaken by man, and that is the truth. Because of the fact it is so enormous in scope, it is going to be expensive, and it is a matter that should have the best considered study by those that are going to put this program into effect. This is a program that is going to take 30 years more to complete and according to the lowest estimates it is going to cost more than $9 billion. Because of that fact, we can well understand why you are coming out here to get the thinking and the ideas of people who live all over South Dakota and in other States in the basin. I don't need to tell you that the people of South Dakota are very interested in every one of the benefits that is going to come from this program. We are interested in flood control. We are interested in irrigation. We are interested in power; in navigation; in soil conservation; and in recreaton, from the development of this great basin area. A program that is going to dam the rivers in the Missouri River Basin to supply water when we don't have enough, and at the same time is going to hold back the waters when we have too much, is a program that is going to be looked upon with a great deal of anticipation by the people in the 10 States and in that portion of Canada that comprises the area of the Missouri River Basin.

This is a gigantic program. It is one that most people are interested in. That is attested to today. Farmers from all over South Dakota have come down here to this committee to tell you in unequivocal terms what they think about this whole program. It is planning for the future and well can we do so.

The population of the United States today is 150 million people. It is estimated that in 1975 that we will have 190 million people. That presents a real problem, to feed those 190 million people, and that is what we are going to have to do. There isn't one more acre today in the United States than there was when the Norsemen discovered America in the year 1000. There isn't 1 acre more. There are a good many acres less because of depredations of our soil. As this Nation grows and gets more people we are going to be beset with the problem of furnishing means of raising the necessary food. It has been said,

and I suppose it is true now, as far as we are concerned, that every morning when they open the doors of hospitals in the United States there are 5,000 more mouths to feed, and in order that we may have enough food, in order that these people may eat, we have got to find enough ways to have food in 1975 for almost 200 million people.

It means we have got to do several things. We are going to have to have better land management so that our land will produce more and at the same time we have got to take some of this marginal and submarginal land and make it productive. You gentlemen, who are members of this committee, are chargeable with this most important task of seeing that the planning for the population of tomorrow is done today, and not that we have to wait until some time when we suddenly discover we don't have enough land to feed our people.

It is an important proposition, and I know you will meet the immediate challenge. As I go about the State and discuss the Missouri River program there are many people who say "What about the cost?" They say "Isn't it too expensive?" "Isn't it something to be put aside?" "Why should you put up these dams?" "Why should we do anything about this matter?" "There is a war on, or so it appears." "Let's concentrate on fighting this war." I would like to tell you gentlemen that that is the thinking of the people of South Dakota, and we must arm ourselves and provide ourselves with defense, and at the same time we cannot afford to fight and carry out the peaceful pursuits of feeding our country. It is going to be a tough job to be carrying out the peaceful development of the United States and at the same time to be carrying on defense, and the matching of funds necessary for both of those is going to be in your hands. I feel that whenever we build in the United States an internal spirit we are increasing the defense potentialities of the entire country. So I say, we have started on this great program, we have many of those dams under construction, the dam at Fort Randall is 45 percent completed, we cannot afford to just simply cut out the program that we have embarked upon. It would be false economy to completely lay down on that and to turn to something else. The cost is going to be great, but it is not going to be expended in 1 year. It is going to take 30 years. In other words, this is a great project to be working on all of the time for the next 30 years. This is a proposition that is going to take time. It is going to be quite a problem to balance the equities of both national defense and carrying on the development of the basin. The United States of America needs this Missouri Basin. It is not some kind of boondoggle that has been sought by the people in these 10 States. The building up of the basin, preventing of floods, the development of the bread basket of the United States, is something that is national in scope and is necessary so far as this program is concerned.

A lot has been said here about study. I agree with Mr. Johnson and others that have preceded me, that a great deal of study is going to have to be given to this program. I am inclined to the view that we should study and get all of the facts that we can and proceed, not hurriedly, with the result that we are going to stumble, but see that we go along in an orderly and scientific manner, and that is one of the things I want to point out to this committee. We must have proper studies made in order that the proper program is developed. I feel that we must above all develop all of the phases of this program dur-

ing the time it is under construction. We cannot go ahead and take the buildings of the dams alone. We cannot just work on one phase. We must have development of the agricultural phases as well as the phases of dam construction. Those two must go hand in hand. We have got to have a complete and integrated plan. That is why I come to you today, as governor of this State, and tell you that it is highly important and highly necessary that the agricultural features are carried along just as well as the construction of the dams. I feel that this coordination is absolutely necessary, because as a drop of water crosses the dam at Oahe, or whatever dam it crosses, it must have treatment way back where it fell on the land away from the dam. It has got to have the kind of treatment in order that we have a program that is going to be successful in its entirety.

A lot has been said about the administration of the basin program. A lot has been written by different men. I don't suppose you are concerned with the administration, but I can say that the Missouri Basin Committee, of which I am a member, feels that the present Pick-Sloan plan is working out exceptionally well. Personally I am opposed to the MVA. I feel that it brings in a group of individuals that do not have close contact with all of the features of the plan, and thinking of the people in the basin. I feel that the Pick-Sloan plan is doing a wonderful job. In order that we may have not missed any bets the committee asks the Council of State Governments to give it considerable study and come up with ideas as to how we can best administer the peaceful affairs in the future. The Council of State Governments has made preliminary studies and they are going to give us the benefit of them at the next meeting, which we are going to have in Lincoln.

Gentlemen, I am very happy that you have given me opportunity to come here and tell you what I think. I am very happy that you have come here and taken of your vacation time to enable the farmers of South Dakota and persons interested in this proposition to stand right up here and tell you in plain English what they think about this great, gigantic, and very necessary program in this great Missouri River Basin.

Thank you very much.

Mr. LOVRE. May I say to you, Governor Anderson, that the Governors of Kansas and Nebraska echoed the same words you have this morning.

Our next witness is Mr. Edward L. Jacobsen, of Carpenter, S. Dak. Mr. Jacobsen.

STATEMENT OF EDWIN L. JACOBSEN, CARPENTER, S. DAK.

Mr. JACOBSEN. Mr. Chairman and members of the committee, I am rather at a loss for words. I came down here today to argue for a coordinated conservation program to go with this Missouri River Basin development. I am surprised to see how favorably you look upon this plan. I don't know that I can say anything that has not already been said.

The plans of development of the Missouri River seem to me to be all based on the precepts that several large dams for the development of power for the purposes of irrigation and flood control will be to the benefit of all people in the Missouri River Valley and the

United States as a whole and that the water from this watershed should be used in no other way.

There is only a certain amount of water in this entire area to be used for all purposes. To me it would seem that the primary purpose of this water is to produce food for our consumers. The area of South Dakota, as well as some other States, that is drained by the Missouri River is in one of the great spring Wheat Belts and one of the large great-plains range areas which produce much of the Nation's beef, mutton, and wool. If this production is to be increased or even maintaned, much of this water must necessarily be used for such production. For dry-land farming more of this water should be withheld where it falls by means of terraces, contour farming, summer fallow, and other conservation practices. For the production of livestock more of this water should be kept where it falls by means of dams for livestock water, pasture furrows, small diversion ditches, and dikes and spreader systems.

The lands of South Dakota, and for a large part the other States in the Missouri Basin, have been brought into production in the period of my lifetime. They are new lands with most of the potential productive capacity remaining. Older lands in the eastern and southern sections of the country are now in the stage of deterioration where it is necessary to rebuild them for production purposes. The lands along the Missouri do not have to be rebuilt—merely maintained—and the time to start is now. It is much easier and far less costly to prevent erosion and maintain fertility than to rebuild wasted land.

Such practices not only will insure grass for livestock and their water supply and larger crops of wheat and feed grains but also prevent erosion of the soil and silting of larger dams in the tributaries and main stem of the Missouri River.

The gross agricultural income in South Dakota in 1950 was $707,303,000. This was from an agriculture established at the present time and that can be assured and increased by the better use of water where it falls. It does not seem to me to be practical to sacrifice such production on about 28 million acres of grassland and 17 million acres of cropland for the purpose of irrigating a relatively very small acreage. If the basin were a desert that could be reclaimed and made productive this matter would be different, but it is not a desert; it is at present a highly productive agricultural area.

The use of water for irrigation in this area will necessitate a shift from grain crops to more intense farming of truck or garden crops as proven in other areas brought under irrigation. This also means a shift in population as the dry-land farmers with tractors and combines will be loath to shift to the hand labor required in the production of irrigated crops. It has by no means been proven that the economic status of the people has been improved by this shift from dry land to irrigated farming.

That flood-control measures must be taken at the point where the water falls was demonstrated in the recent Kansas City flood wherein the watershed creating such floods was beyond the effects of the large dams.

I am, therefore, firmly convinced that the best use of the water for the people of the valley, and the United States as a whole, can be made by keeping this water where it falls and that under any plan this can

be best done by the practices mentioned above and other conservation measures.

Mr. LOVRE. Mr. Frank Roberts, of Pierpont.

STATEMENT OF FRANK ROBERTS, PIERPONT, S. DAK.

Mr. ROBERTS. Mr. Chairman and members of the committee.

The second speaker before me covered 11 States. Mr. Jacobsen has got down to one. I am coming down to one county.

I was born up here in Day County, and chances are we furnish a little water that gives you fellows down in the south corner some trouble. We are doing something about it in a minor way. How much will be done we have no way of knowing. It is true we do a little ditch work up there. We have been criticized rather seriously in Day County by some of those who are boosting wildlife that we are ruining their places. We are not. The areas we drain are rather small. The farmers who drained the areas put them into production, and dams will replace those areas and there is still plenty of cover left.

I would like to make just one point. That is when the Government embarked on this program of soil conservation, they were offering it to men who, from the very nature of their business, are very independent. The farmer has got to have some initiative. He has to be self-reliant. He does see what happens on his neighbor's land when his neighbor starts something, and they will discuss it at some length.

I would like to leave this thought. That this program is progressing. Very slowly, but nevertheless it is progressing, and by all means should be continued. Thank you.

Mr. LOVRE. Mr. John Dawson, Hawarden, Iowa.

STATEMENT OF JOHN DAWSON, HAWARDEN, IOWA

Mr. DAWSON. Mr. Chairman and Members of the Committee, Governor Anderson, and Senator Mundt.

I am John Dawson, a dirt farmer, owner of a dairy farm in Union County, S. Dak., northwest of Hawarden, Iowa. The last gentleman mentioned a county. The problem I am going to bring up probably doesn't represent a pinprick on this map of the Missouri Basin. I want to mention one of the small arteries of the Big Sioux River. It is known as Union Creek watershed in Union County, S. Dak. I am bringing the problem of a group of farmers and land owners who live in the bottom land where this stream joins the Sioux River. I don't have any prepared statement. I would like to read the statement of a farmer, and this statement has been verified by the land owners in the group.

(The statement as read is hereinafter set forth.)

The $250,000 crop damage in 1944 may need a little explanation. This was a year of excessive waterfall, and naturally more severe damage as it came when the crop was all up and almost ready for harvest.

Another explanation here, which gives the figure for "1945 to 1949, none. Protected by new channel and dikes constructed in the fall of 1944." The farmers became disturbed and they called in an engi-

neer that designed a channel, a wide channel and dikes. That was well designed. It had capacity to carry any flood. The bottom was seeded to grass to prevent it from eroding, but he didn't take into consideration the silt problem.

Now, in 1950, the damage was $30,000. At that time, this particular area that it drains out, the erosion had probably reached the vicious circle where more erosion causes less organic matter in the soil, which makes poor soil, which makes more erosion, and so on.

The next figure, for 1951, probably bears that out: $100,000 damage on 1,600 acres. At that time this channel was silted in entirely. The water just came out of this creek and went down across the valley for miles. I might mention that before man tampered with nature this stream came out of the hill area; it followed a natural course and well-defined channel to the river and didn't cause any trouble at all. As more of this rough, steeper-slopped land was put under the plow the siltation problem became greater, and that is what has been happening down there. Crops grown in this area are 60 percent corn and 25 percent wheat. It is 10 percent pasture and 5 percent hay. This is highly productive land and is capable of producing 100 bushels of corn per acre and 50 bushels of winter wheat. It is not bottom land.

Now, Mr. Smith earlier gave something about the over-all recommendation for curing this. I just want to say that first the farms, out on the small watersheds, clear up at the draws and ravines where it starts, I feel should be the basis of any program. I mean, by that, terraces, grassed waterways, more of the cheap land put into grass—some of it permanently, the steeper slopes. Then when that is done we can get down to these retarding dams and basin reservoirs, or whatever you want to call them, because unless these conservation practices are put on that land your reservoirs are going to silt up in a short time. The same thing will happen as happened to this channel that was dug there. Then, when that is done, you get down to the bottom area where a channel to carry the water is necessary; but, if these other things are done up above that, they will have no more trouble with these floods.

I might mention that this problem of this group of farmers was presented to our board of supervisors. I happen to be a member of the Union County Soil Conservation District Board. Their problem was presented to us. We, in turn, asked the Soil Conservation Service for assistance. The work group and engineer from Yankton made a preliminary survey of this bottom-land area; all of the land in this watershed, in fact. This is his report to our board.

A large number of farmers in Union County had petitioned our assistance to control floodwaters of Union Creek. I have looked over this project, and in my opinion the only way in which we could handle the project would be under a flood-control set-up similar to Little Sioux project in northwestern Iowa, whereby a series of detention reservoirs and control dams would be constructed.

Union Creek drains an area of approximately 40 square miles and enters the Big Sioux River west of Sioux City, Iowa. The drainage area is in the light-soil section of Union County, and most of it is fairly soft; so the runoff after rains is fast and it carries a large amount of silt. Where the creek comes out of the hills onto the Big Sioux River land it drowns out crops and deposits large amounts of silt. The Union County commissioners are interested in the project due to the dam-

age done to roads. In the past few years almost every rain of any consequence in this area has caused excessive damage.

I might mention another thing in connection with this area that perhaps is not typical of many other watersheds. There is very little soil conservation on this land. Perhaps less than 1 percent of the farmers in this area have complete soil-conservation plans on their farms. Probably less than 5 percent have done some work.

That brings me up to the question; When our soil district was set up 11 years ago, the supervisors thought it would just be a question of getting a few key farmers into soil-conservation work and the thing would just accelerate, and in not too many years the majority of the land would be in soil-conservation work. That has not worked out that way. Maybe we farmers are a contrary bunch. I don't know what is wrong. It seems as though it is pretty hard to talk them into going into soil-conservation work. They say: "It was good enough for my grandfather and my father; they got along without it, and I can get along without it, too." The trouble is, their son and their grandson are going to have to get along without a farm. Another thing they say: "This is an act of God. All we can do is pray it won't happen again." But they can do something about it.

I am discouraged being a supervisor in a district that can't get more done. I think the gentleman from Iowa State mentioned about education. I feel it is a matter of education, and work could be done in that line. Maybe some of us old, hard-shelled farmers should just be let go and work on the younger generation. Right now our county extension agent is one of the best men in the county, but he can't take on any more work. He acts as secretary of our district board. He is rushed all of the time. He does all he can. Some additional men for education will have to be had.

I think that is all I have to say. Thank you.

Mr. LOVRE. Mr. Sam Ulrikson.

STATEMENT OF SAM ULRIKSON, SUPERVISOR, LINCOLN SOIL CONSERVATION DISTRICT

Mr. ULRIKSON. Mr. Chairman and friends, I am a farmer. I am very much interested in soil conservation. I have been on the soil-conservation board for about 8 years. I know something about what soil conservation is. I have been a farmer for a number of years. I am still a farmer. I know that what we need is to keep the water on top of the hill and not let it do any damage going down the hill. Let it go down in the ground. That is the main thing about soil conservation. Keep the water where it falls. We have in our territory what we call Petty Creek survey. The survey was made of Petty Creek. Petty Creek is a creek running from my place down to the Sioux River, and in this area is something like 32,000 acres. It is about 15 miles long. This area has been surveyed for erosion dams and complete soil conservation. This information is on file at the Lincoln office. When they are talking about demonstration places, I think this would be a good place to build up a demonstration of what can be done when things are done in the way they should be done. Hold the water back on top of the hill so it doesn't get down and bother the people down below. We drove around a little yesterday and we found the valley down below is getting the biggest damage.

We up on top of the hill are losing our soil; but, when you get down the valley, it is covering everything they got down there.

I happened to buy a farm that was very badly eroded. We had a very bad rain. I got a lot of kick out of it afterward. They said, "Why don't you keep that stuff on top of the hill and not bring it down our way."

We need a lot of technical assistance to do this. We would appreciate it very much if the local soil-conservation district could be furnished technicians and people who understand these things so we can work them out.

Thank you.

(The prepared statement of S. K. Ulrikson follows:)

LINCOLN SOIL CONSERVATION DISTRICT.

To: House of Representatives Agriculture Subcommittee.

Subject: Testimony on soil-conservation and flood-control problems, activities and suggestions from Lincoln County, S. Dak.[1]

I. Flood damage and erosion starts on individual farms where moisture falls. Therefore, a complete soil-conservation program on the individual farm is essential, especially on the upland areas; not only for the people's own protection but also for the protection of those living below them. This work should be done under the supervision of the Soil Conservation Service through the local soil-conservation district.

II. The Lincoln Soil Conservation District, after 10 years of operation, has very definite proof that where a group of farmers in a watershed follow a good soil-conservation program the runoff is greatly reduced. This reduces erosion, flood, and silt damage. In this way, desilting basins and dredging of streams will be unnecessary.

III. It is also the opinion of the board of supervisors of the Lincoln district, as well as many of the district cooperators, that small flood-control structures are essential along with a soil-conservation program to catch any silt and slow up the water. This is especially true when "gully washer" rains occur or snow melts rapidly in the spring.

IV. On the uplands the problem is to get as much moisture to soak into the soil as possible, while on the lowlands the problem is to keep any runoff from damaging crops, roads, etc. This requires a drainage system that has been well planned and constructed by experienced engineers. A complete survey of the watershed is essential in order to plan such a system of drainage.

This brings out the point that this whole soil-conservation and flood-control job should start at the upper end of the watershed. The farmer on the bottom lands is helpless unless they can all work together on the problem. Such a program requires assistance from the Department of Agriculture and its agencies.

V. Even in these times this work should not be curtailed, because high production of food crops is essential to our defense efforts. If anything, the program should be expanded.

FLOOD-CONTROL PROBLEMS IN LINCOLN COUNTY

I. The flood damage in Lincoln County is due largely to runoff water from small watershed areas leading to the Big Sioux and Vermillion Rivers. Pattee Creek is one of these tributaries of the Big Sioux in which a study has been completed for a flood-control program. This information is available at the regional office of the Soil Conservation Service at Lincoln, Nebr.

This watershed is 32,000 acres in size with an over-all length of 15 miles. At the upper end is steep land that is badly gullied. Running almost the full length of this area is 6,400 acres of valuable bottom land which is completely covered when flooding occurs. This has happened as often as four times in a single year.

[1] A complete conservation program in Lincoln County would consist of a good crop rotation, terracing, contour farming, grassed waterways, pasture and hayland seeding, tree planting, dams, and crop-residue management, in the main.

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Assistance in the form of technical help and finance is necessary to put a conservation and flood-control program on this area. The gullies are so large in places that it is impossible for local farmers to carry out a flood-control program without outside assistance.

Similar problems to this one exist in many places in southeast South Dakota, and a solution is possible as shown by similar areas in the Little Sioux watersheds east and south of Sioux City, Iowa, and other parts of the United States.

The following measures are considered necessary to give permanent protection to the farms of southeast South Dakota.

1. A survey should be made of the James, Vermillion, and Big Sioux Rivers' watersheds.

2. We feel that the agricultural phases of the Missouri River development program has been neglected and that Congress should take steps, at once, to provide an expansion of the Soil Conservation Service so that work can be started on flood-control work in southeast South Dakota and the soil-conservation program expanded.

3. Plans for such a program should be completed before the Sioux, Vermillion, and James Rivers' channels are cleaned out, so that this will not be necessary again in the near future. These streams are in need of dredging in many places at the present time.

4. Some consideration should be given to providing funds to give temporary protection during these times of national emergency when food production is so essential.

Respectfully submitted.

LINCOLN SOIL CONSERVATION DISTRICT,
SAM K. ULRIKSON, *Supervisor*

(Presenting the testimony at Sioux Falls hearing November 1, 1951).

CANTON, S. DAK.

Mr. LOVRE. Mr. Lawrence Elsinger, of Dell Rapids.

STATEMENT OF LAWRENCE ELSINGER, DELL RAPIDS

Mr. ELSINGER. Mr. Chairman and members of the committee, I first think we should thank the committee for listening to this bunch. They really have a tough job.

My name is Lawrence Elsinger. I am a farmer and a member of the soil-conservation district. I am a member of the Soil Conservation Society of America, also a member of the American Society of Agronomy, and supervisor of our local soil-conservation district.

This meeting here this morning has kind of put the picture in my mind, like how water can upset a lot of people in Sioux Falls. Water very frequently will get in their garage or basement. One fellow hollers we have got to put in a big dam to stop it. The next guy diverts it from running on his land. One fellow digs a ditch to run it off. The next fellow wants to use it for irrigation. Everybody has some kind of job for the water. I am not going to talk about any of those problems. I don't know the answer. I farm, in all, 700 acres, and it is all under a good conservation program. It is in these rolling hills in Minnehaha County; so, it is not waste prairie land of any kind. I have been interested all of these years in finding some solution to the problem of holding our topsoil, and I have found out the only way to hold topsoil is to hold the water. If we can't hold the water, we can't hold the topsoil.

The biggest problem we have in this area is not dams or dikes that should be built; but I wonder if you gentlemen realize that nearly 50 percent, and maybe a little more, of our land here in this area is being farmed by tenant farmers; that is, 50 percent of the area out of this county. Stop and think what that means. There is a bad story behind it. To get through to the tenant farmer is one of the biggest obstacles

to a good soil-conservation program in this territory. The biggest obstacle is that the poor fellow is under pressure himself to make a living for himself and his landlord. He will not spend any money of his own on the land he is farming because he has to get every dollar he can get out of it if he is going to make two ends meet. Until we can find a way to pay that fellow and put soil conservation on this land, he is going to let the water run. He is not going to do anything on that land that is going to be given to another fellow next year. Maybe he should not be that way. They are just down to a point where they are going to do just so much.

The solution to the thing is—I don't know what the solution is; I am not a man of big figures. I have often wondered what it would cost to buy all of this land in the Missouri Basin and put it on a conservation program and then give it back to the farmer. But we are going to have to start there. We are going to have to start uphill where this water falls. I think if we get started uphill in the right way, the bottom will take care of itself. That is why I think we maybe should make more or bigger payments as a sort of incentive to start the conservation program. It is going to have to be run under some sort of program whereby, if it is established, it stays there and is kept up and maintained. I know we are making big payments somewhere. I think we are just fooling ourselves about where these payments are going. Why not make this payment at the source. I don't know if that is the answer. It could be one answer. I think right down in the bottom of my heart that there is where the start has to be made.

Thank you.

Mr. POAGE. Before we adjourn I want to express to this group my appreciation of being present. I apologize to all of those here for the fact that we did not quite anticipate just how much interest there was in this soil conservation and flood prevention program. This committee originally anticipated that this program would end by 1:30. Relying on that, when I received a telephone call this morning, after the hearing began, advising me that the chairman of our committee, who is not present today, but who was to have spoken at Omaha tonight, was sick and could not be there. I promised to go down there and appear in his place. The result is I will not be able to hear all of the testimony here, but I do want all of this group to know I appreciate the interest that has been shown and the help they have given the committee. I want the Governor and Senator to know how much I appreciate their presence here. I think it is a grand thing we can have meeting of this kind where Members of Congress can get a far better picture of the problems of the people than it is possible to get in Washington. I am glad I came to Sioux Falls. Probably we would not have been here had you not had the foresight to elect Harold Lovre to Congress. He said this morning that you had placed him in a difficult position—that was before the Senator arrived—because he had big shoes to fill when he went to Washington. But he has done a grand job. I think the people of South Dakota have done a grand job in the representative they have sent to Washington.

I hope you will understand that it is not any lack of interest on the part of any member of the committee that I will not be with you this afternoon, because I do feel this is one of the grandest meetings we have had.

I thank you all.

Mr. LOVRE. We regret you have to go, but we know the reason why. We will excuse you.

I want to say to Bob Poage, as chairman of this subcommittee, he is doing a grand job, and we are happy, Bob that you could have found time to spend this morning with us.

(Whereupon the hearing was in recess until 2:30 p. m. this date.)

AFTERNOON SESSION

Mr. LOVRE. The meeting will please come to order.

We have two friends from the State of Iowa who are in a hurry to get back home, and have a short statement they would like to make. First, Mr. Parkison.

STATEMENT OF QUENTIN PARKISON, PERCIVAL, IOWA

Mr. PARKISON. Mr. Chairman, I want to say to you the people in the State of Iowa, who are affected by this program, appreciate very much your taking the time to come out here for these hearings.

I do have a statement that I would like to have included in the record. If I may present my statement for the record I will appreciate it very much.

Mr. LOVRE. Where are you from?

Mr. PARKISON. Fremont County, in the southwestern part of the State.

Mr. LOVRE. Thank you.

(The statement referred to above is as follows:)

My name is Quentin Parkison. I live at Percival, Iowa. I have lived in the Missouri River Valley all my life, farmed there for 29 years, and for the last 13 consecutive years have been elected by my farmer neighbors to serve as county chairman of our agricultural conservation program, during which time I have acquired some knowledge of the area and the flood problems. However, I assure you I appear before you as a citizen and taxpayer not as a promoter.

We are grateful to you for taking time to hold hearings on the development of the Missouri River Basin. We realize how busy you are and how valuable your time is, but we believe the need for the development of the basin is so important, and flood conditions along the river so severe that we are sure you can justify flood-control efforts.

I am vitally interested in flood control. My grandfather settled in the Missouri Valley in Fremont County in 1849 and I am still interested in the operation of some of the land he started operating.

The greatest need in much of the Missouri Basin is some kind of income stability for the people in the area. Since the people have no control over the weather or the economic health of the Nation, it is difficult to stabilize the income of the area. However, there are needs of the area which can be supplied. The most important items are soil conservation, drainage, and flood control.

In thinking of flood control the question of private levees always comes up. However, it should be considered that we have been building private levees since 1881. None of them gave adequate protection as evidenced by our disastrous floods. Consequently, you can see why the people feel that only the Government can control the river.

There are about 700,000 acres of bottom land in Iowa subject to flooding by the Missouri River and its tributaries; 492,000 acres of the land is along the Missouri River. The levee system already proposed together with adequate soil conservation practices would protect most of the land from flooding and we believe the reservoirs upstream and on the tributaries should make the levees more effective.

Our county has some 60,000 acres that are affected. We believe the land and people in our county are representative of the whole area. You can visualize the seriousness of the flooding conditions in the area by citing some facts that

apply to our county which is representative of the area, and when we think of all the river counties in Iowa being affected the same, I am sure these facts justify flood-control measures.

The area in our county that is subject to flooding by the Missouri River is serviced by four popcorn companies, three canning companies for processing our vegetable crops, and we have six elevators that handle the shipment of cash corn, wheat, and soybeans. The area has been a heavy livestock producing area, but the frequent floods have of necessity reduced many successful livestock producers to grain farming. In the towns of the area we have a population of 2,500. On the 60,000 acres of farm land there are some 370 sets of improvements together with the farm families.

The land is capable of an annual production of 41,000 acres of corn, 9,000 acres of wheat, 2,000 acres of popcorn, 800 acres of soybeans, 5,000 acres of sweet corn for canning, and 2,000 acres of peas for canning. Elevator operators report that in normal years they ship over 2,000,000 bushels of grain from the area into commercial channels, while in flood years there is very little produced.

The high state of productivity of this land, the modern equipment on the farms, together with the farmers ability when given adequate protection practically assures peak production. Conservative estimates from reliable sources show that the valuation of the affected area is in excess of $20,000,000, not including livestock, farm equipment, grain kept on farms, household goods, and stocks of merchandise.

We were flooded in 1938, 1939, 1942, 1943, 1944, and 1945. The damage caused by these floods has been extremely serious. The 1943 flood affected 225 farms with 45,000 acres, as well as homes, roads, bridges, railroads, and drainage systems. The 1944 flood caused calculable damage of over $1,600,000. This does not count the death and physical damage to the people of the area and believe me you can't go through these floods without serious damage to the people. You work day and night for days, then in many cases see your crops, livestock, and personal property swept away.

We are confident the basin can be developed. Already the channel in our area has been stabilized and an agricultural levee unit completed. As evidence of the success of the river development program thus far and for channel stabilization I would call your attention to the fact that during our last six floods the river has flooded much of the area and at times in excess of 50,000 acres were inundated; had it not been for the channel being pegged down, no doubt, it would have cut new channels and from the course it took it might have left the Burlington Railroad bridge and highway bridge over the Missouri River at Nebraska City, on an island, but never once has it failed to go back to the stabilized channel.

Flood control is a sound investment for the Government. Not only the lives and property of the people are affected but we learned from one of our tax accountants that in years when we do not have floods the Government receives about $4 per acre income tax from the sale of crops produced on the land. The same accountant showed me a record on one 480-acre farm alone in the area where the Government loses $2,000 income taxe each year they have a flood. Think of the loss to the Government in income tax alone when we have floods. We believe that river control will actually pay for itself.

I would also direct your attention to some information to show the upper river reservoirs will not give us adequate flood protection:

In 1943 the worst flood since 1883 hit our area and it was at a time when the river above Omaha was below flood stage. However, enough water came out of the Platte River alone to raise the river in our area 6 feet above flood stage and caused a very disastrous flood, even though there was no threat of flood up the river from Omaha. Agricultural levees are necessary if we are to have protection from floods from the tributaries.

The development of small watersheds will be a material aid in flood control but it can never give complete protection without development on the main stem and the tributaries, and flood disasters that could come while the small watersheds are being developed could be terribly expensive. Small watershed development will supplement an over-all program, but it will not replace it.

In our county alone a recent survey by the Soil Conservation Service shows that we need 13,000 miles of standard and diversion terraces. They also report we should have 33,000 acres of land that is now in crops planted to trees or other permanent vegetation. In the last 7 years we have built about 1,500 miles of terraces, however, the rate of construction has increased from 49 miles in 1944 to 245 miles in 1950.

It will be very difficult and slow to obtain individual cooperation that will be necessary to furnish flood control by land use and conservation practices. However, the United States Department of Agriculture should promote an aggressive program to develop the agricultural resources of the area. The farmer committee system used in the farm program has proved to be an efficient way of obtaining farmer cooperation.

Farmers, ranchers, and landowners should be reimbursed in part for the cost of installations and application of practices for many of the benefits are in the public interest and require major adjustments in farm operation and temporary loss of income. Also, drainage problems will result on the thousands of acres along the river that will be affected by the levees.

Time is important, each flood gets bigger than the last one. The situation is so serious that we are sure the Congress should do all in its power to speed up the development of the Missouri River Basin program.

Mr. LOVRE. Mr. Acree.

STATEMENT OF HARRY R. ACREE

Mr. ACREE. There is just one thing that came up awhile ago. The fellow said something about buying the land on both sides of the watershed. We have a problem on Moody River. We have spent enough money on both sides of that creek to have bought all of the land in maintaining it.

Thank you.

(Additional statement submitted by Mr. Acree follows:)

SIOUX FALLS, S. DAK.

My name is Harry R. Acree and live in Missouri Valley, Iowa, county of Harrison, and wish to present to this committee certain points which I believe make the Pick-Sloan plan a necessary part of the national economy. I am a farmer, was soil district chairman for 8 years; chairman, 3 years; and now a farm manager.

Much has been said about the need of the plan, and I believe all who understand it are convinced Congress should proceed without recourse with the necessary money to complete the project. I believe that the necessary agencies are now in existence to handle all problems, but that they are not being used to get the maximum results.

The success of the plan depends not on money alone but upon the proper education of the people in the basin. This should be accomplished by giving more money to SCS so that the commissioners of the district may be paid for service and used more. The Extension Service should be separated from farm organizations so they can work with more people the way they see fit. The PMA should be allotted more money so that the township committeemen could be schooled on the problems involved in the over-all plan and used to get the information and practices needed better understood by the farmer.

If education fails to do the job, why not have laws to control land use similar to those we have on every other natural resource in the country such as forests, fishing, roads, oil, and so forth. Above all, use every effort to make this Pick-Sloan plan work or sooner or later this United States will go bankrupt county by county, as goes our natural resources so goes our country.

HARRY R. ACREE.

Mr. LOVRE. Mr. Fred H. Brady.

STATEMENT OF FRED H. BRADY

Mr. BRADY. Mr. Chairman, members of the committee, I have just one thing I would like to present to the committee in relation to the meeting which took place in 1941. They were talking about the responsibility for erosion control on federally owned or federally operated lands, and the Secretary of the Interior. These lands are in the Missouri Basin. There are 21,689,000 acres of these lands lying within

the boundary of the Missouri Basin. On these lands we think it is well to have a coordinated program between the Department of Agriculture and the Department of the Interior to be worked out so that the lands of the Government can go along with the lands that are privately owned, because if they are not, you will have a large acreage of land within your boundaries without proper protection, and that land, coming under an accelerated program, will be an eyesore. On the Colorado River they say the Bureau of Indian Affairs has 10 percent of the land and contributes 30 percent of the silt. I don't think that should be allowed to happen in the Missouri Basin, that the federally owned lands, a small percentage, can contribute a large percentage of the silt to your reservoirs. The Indian people in the Missouri Basin are being faced with a big problem in that way; the Crow Creek, Cheyenne River, and Standing Rock and Fort Berthold Reservations are losing a lot of their bottom lands. That means that they cannot and do not have an additional acreage that they can acquire. They are going to move up to the upland, and erosion hazards are going to be greater, intensive operations will be greater, and erosion hazards will be greatly increased. Therefore, I think it is imperative that the Department of the Interior coordinate an accelerated program with the Department of Agriculture in the Missouri Basin conservation program.

Mr. LOVRE. Thank you, Mr. Brady.

Mr. E. A. Gronlund, of Volin.

STATEMENT OF E. A. GRONLUND

Mr. GRONLUND. Mr. Chairman, members of the committee, and fellows, I am no speaker. I am just an ordinary farmer living in the northwest corner of Clay County. When my attention was called to this meeting—it was day before yesterday—I was plowing a diversion terrace. So far as developing the river where I live, we are happy about it. We think about cheaper electricity, and we think about the people in the low lands there that said they were getting flooded out. We also think about our neighbors south, like Iowa, Nebraska, and all that.

In our immediate vicinity—and that holds true, I think, throughout the whole State—is gully control. When we have a cloudburst or flash flood, our black soil goes down the drain, so to speak. The only answer we know for that problem is to put in contour, put in terracing and grassed waterways and pasture improvements. That is what some of us are thinking about, and maybe, you might say, worrying about. When you people in Washington have got your eyes on the Missouri River, you might accidentally forget us. I hope that won't be true. I think we need technical assistance and possibly some of the inducements to put in more waterways, put in more terraces and pasture improvements. We have a lot of land that never should have been plowed in the first place. There maybe could be some inducement to take that out of production and put it back into pasture, where it rightfully belongs.

I do think, truthfully, the soil-conservation program should be high on the list, because if our topsoil is gone the value of our land has deteriorated, and the bread basket of our Nation has got lots smaller.

I think this man from Yankton is in the same neighborhood that I am. He spoke almost 100 percent the way I feel about it. We need to protect our soil for the good of the Nation as well as the individual.

I thank you.

Mr. LOVRE. Mr. Wiley, of Vermillion.

STATEMENT OF MR. WILEY, VERMILLION, S. DAK.

Mr. WILEY. Mr. Chairman, members of the committee, and others interested in this hearing today, I also am a farmer and live just off the bottom of the Vermillion River. I do have some land that very nearly borders it, and I am interested in Vermillion River flood control also up in the area where I live. Up there my problem is the water that runs off toward the valley—that bothers me. I am very much interested in soil conservation. By "soil conservation," I mean a full, rounded-out program of soil building, soil management, and so forth. I think, like some of the others, that possibly—I don't need to say we need education, because I like to think that we farmers are educated, but we do need a little pointing of the way to some of these practices and the benefit of some of these practices that would help give us suitable agriculture and suitable soil, because, after all, we are making our living from the soil and, therefore, we are not only interested in what we can get off of it now but in years to come. Therefore, I think we need some Federal help in a local way, and I would like to see this administered as much locally as possible. Let local units set up as much of the machinery to administer this plan as possible. I would like to see education by demonstration of actual soil-conservation projects in a certain area. Thinking of renovation of some of these farms that are badly eroded: In our area we have erosion along with flood control; so, we are very much interested in keeping this water where it belongs. I think that is the big thing, although we certainly are not against the Missouri River Dam. I think these propositions are all tied together and that we should have a way, probably by incentive payments, because grass-seed charges become so high it is pretty near out of the market so far as farmers are able to buy it. Saving of this grass seed so we can put more of our steep land into grass, and more actual conservation practices on the farm, such as terraces, diversion ditches, and so forth. I am thinking of one in my own particular instance where on 160 acres of my land I have lost approximately 70 acres of that crop through water coming across me from someone else. I was fortunate that I have the drainage over my farm so I am well drained, but I have a surplus of water coming from the others. On the bottom that I farm, we constructed there this summer a ditch that cost $500, and that is 100 rods long. We confined that flood to the channel; so, I save 60 acres of crop down there.

I would like to urge that these practices be retained in the Missouri dams, and all that, but I would like to see some way of better relations between tenants and landlords, for instance, as was mentioned this morning. It is not too big a problem in our area, because many own their own lands. This insecurity of the tenant and his hesitation to go ahead with good soil-building practices, which he knows in his heart we should have, because of the fact that he has that insecurity of not knowing whether he will be there next year or not. So, I would

like to see this program brought back to as much local control as possible with what help the Federal Government can give to us.

I think that is all. Thank you.

Mr. LOVRE. May I say, on behalf of the committee, we certainly are very much interested in receiving testimony from actual farmers on this conservation program.

Mr. Horace Wagner, of Reliance.

STATEMENT OF HORACE WAGNER, RELIANCE

Mr. WAGNER. I didn't know I was to be called on today; so I made no prepared statement. I am not a farmer. I am a rancher. I am from God's country over west of the Missouri River. Out in that country we have had soil conservation for some 12 years. I have been intimately connected with it all of the time. I was one of the first conservationists over there; also a member of the State association of soil conservationists.

When we got to talk about soil and water conservation, we did not have the same problems they do down here in the southeastern part of the State. Our depletion of the soil out there comes from wind erosion, and through soil conservation we have learned to raise crops that carry enough residue, so, we don't lose that any more on those thousands of acres out there that in former years lost their topsoil, and thousands of acres of that have been regained in the last 12 or 15 years. We have put in a lot of dams in the country. The greater part of the area is in pasture. We raise those $250 calves. You are on the wrong end of the cattle business, you feeders. We have big pastures out there, and it has always been a problem to graze that pasture properly without water in in the proper places. We have put in thousands of dams. We have spread the pasture so it has almost doubled its capacity to raise cattle on that land. Soil conservation has done that. I could talk an hour on soil conservation, but I won't do it. It has all been said ahead of me, and I am glad you came and and I am glad I have been here.

I thank you.

Mr. LOVRE. Thank you, Mr. Wagner.

Mr. Herman Peterson, of Brandt.

STATEMENT OF HERMAN PETERSON, BRANDT

Mr. PETERSON. Mr. Chairman and committee, I certainly think it is an honor and also I greatly appreciate the privilege of coming here as a farmer from Deuel County, Mr. Lovre's home county. I have known him as a boy. I certainly think it is a great thing that these people come here to hear us farmers.

There has a lot been said here today. Probably, as the last speaker said, it would be more or less repeating what they said, but I have a problem on my own farm in Deuel County. Although we are in the eastern border of the State and away from the Missouri River, I still think we have a part in that Missouri Basin. We up in the higher lands certainly have a lot of water going that way. I do feel deeply for those people in those lowlands and know what they have gone through. I have it in a small way in my quarter section of land out there in Deuel County, the same experience about losing some of that land in the matter of floodwater erosion in the past 30 years. I op-

erated that farm for 30 years. The first part of those 30 years we did splendid. Then came the dry years and we had wind erosion. Maybe I should put in here somewhat of a story of the farm-paper salesman that came out to sell the farmer a newspaper. He said, "There are lots of good methods of farming." "Well", the farmer said, "I really know how to farm better than I have time to farm now." So, it may be some of our people feel that way. We have been neglectful. We have been handicapped. I was a tenant once upon a time, too. I realize it is hard for him and the owner to get together on some of the problems which confronted him, which was no fault of his own. But we had a water problem in the 1940's when the moisture came. That water could not get away for the wind erosion. It dammed it up. It took over about 40 acres of my land that was absolutely worthless. I don't know how to compete with a situation like that. I know lots of you have the same problem in other areas. I had to go to the other fellow's farm to drink. How was I going to be able to do that. It cost several thousands of dollars to get the job done.

Well, folks, I want to say today I am thankful for soil conservation. I want to tell you folks I have adopted their practice immediately as I saw it. I saw in my own meager way the need for technical assistance and was unable to cope with the situation. Now I am producing crop from every acre of that farm, and I am holding the water just where it belongs. It was my own water if I could take care of it. I had no knowledge of how to do it. Only with technical assistance from the soil-conservation district and the PMA, and they have done a wonderful job of handling the soil-conservation program with the other programs we had. I have worked with them plenty. They have done their job as splendid as it could be done, but they had too much to do. They were not trained men. They were just farmers like us. They tried to do things for the farmers in our area, but it was impossible for us to do it properly. So, I want to say, in behalf of the farmers of Deuel County, our situation there is not probably quite like some of the speakers said here. They were disgusted with the soil-conservation district, with the results they got. We are not. We have had splendid cooperation. We have gotten so in the past few years we have got in more work than our two men are capable of handling. The farmers see the actual need of it. I feel sorry for any man that does not see some need of soil conservation on his farm, regardless of where he may be, because he does. I was almost amazed 2 years ago when our PMA program came out with a grass program encouraging farmers to seed more of their land into grass and legumes. Through PMA they were given assistance. I happened to serve on the committee out there: and in payment for grassland in Deuel County we had estimated $20,000 for grass-seeding payment, and we had application for $70,000 worth of grass seeding. So, I think we should have a little more of this assistance. I don't want to forget one thing, knowing for sure that this is something worth while to the younger set of our country who are coming out as future farmers, future businessmen—I know what I am talking about because I happen to be a leader of 4–H Clubs and know they are interested, and I know there is no better way of getting at the parents of some of these people than through their children—I think if our educational facilities in our smaller schools could have means to forward this education, through motion pictures, or something of that kind, along this line of contour, terracing, and grassland. We haven't enough to go around. I wish that

this thing would be looked into as a means of bringing this education home to the parents through the children. I thank you.

Mr. LOVRE. Thank you. Your recommendation will be given due consideration by the committee.

As you know, Mr. Poage had to leave a short time ago for Omaha. Charley Hoeven has to leave now. May I say this: We have been happy to have had you with us, Charley, and am very sorry you cannot finish out the day.

Mr. HOEVEN. I regret very much it is necessary for me to leave. I accepted a 6:30 engagement for today. I have to drive back to Iowa; so I must leave now.

I have enjoyed this meeting in Harold Lovre's district. He is a member of our Committee on Agriculture. Our thinking is very much alike. Our problems are very much the same. It is the policy of the committee of the House of Representatives to go out and visit with the farmers at the grass roots. This is something unusual. Instead of asking farmers to come to Washington when they may not have the time or cannot afford the trip, it has been our policy to go out to the grass roots and have the farmers tell us what they think of the problems concerning agriculture. I can assure you the committee is interested in all the problems of agriculture and the development of the Missouri River Basin.

It has been a real pleasure to meet with you.

Mr. LOVRE. Mr. Maynard Cochran, of Gary.

STATEMENT OF MAYNARD COCHRAN

Mr. COCHRAN. Mr. Chairman and gentlemen, I agree with the speakers who say we must keep the water where it falls. I don't think it makes any difference if we build a thousand dams down the river if we don't do something about water in the topsoil back where it starts. We will just waste the money we put into it. I think in a period of 30 years it will cost more to dredge those dams again and get the silt out than probably the whole soil-conservaiton program would cost to keep it out. I have nothing against building these dams, because I think a lot of good can come from it. To do that alone would not be too good. It would be something like locking the horse-barn door on one side and leaving it open on the other.

I believe that this Missouri River flood could be partially dried up if everybody in this whole watershed area had their farm under a good soil-conservation program. You may disagree with me on that, and probably you are right; yet, we have never tried such a thing as that. We have but a very few farms set up that way. I have found that these demonstration farms prove more and show more, probably, than all of the talking we ever did. I have taken several groups out. We have made county dams. We have gone down to other farms. We have seen what men have done as far as holding their own water and keeping it there. And those fellows go back with the idea that that is the thing to do. Some of them take a long time to get it done. That will take care of iself as time goes on. I believe in connection with PMA payments this thing should be a more over-all program. We should not just dabble and give a man $50 for this payment for one practice and some more money for some other practice, but rather have an over-all conservation program on his farm. One of the men this forenoon was

rather discouraged with their soil-conservation district. I would like to echo what Herman said here. We are rather pleased with ours up in Deuel County. They have only been in existence 3½ years. So far we have 240 members written on the farms in Deuel County. I believe thereare 1,250 farms in the county. Of these, 60 farmers are near completion of their soil-conservation work.

So, I think that voices my opinion. I would just like to leave with you that I think we should shut off the faucet up in the upper end, rather than waiting until we get way down the river.

Thank you.

Mr. LOVRE. Mr. Fred Kaiser, of Estelline.

STATEMENT OF FRED KAISER

Mr. KAISER. Mr. Chairman, I haven't much to say but what has already been said today, but this is just a small program that we have in our district where I live. I live right down here 2 miles east of this line [indicating]. This is what is known as a group in this program. Water from this creek here comes down here and a flash flood would cut across everything out here. So, when they put in a new road here, a group of farmers worked together and put in a canal over here to the Brokings County line. Altogether, it is about 2 miles long.

Mr. LOVRE. When did you start the project?

Mr. KAISER. I think it was 2 years ago. It has been in these two springs now. There is quite a lot of things to iron out to get a bunch of farmers to agree on a thing like that. That is not the entire answer to flood control, because already this end down here has started to silt up quite severely. These squares here show where the farmers are in soil conservation and they practice contouring. It also shows the need for a whole lot more. Because this summer we had a 5-inch rain and that ditch was just a drop in the bucket. You could not see where the ditch was. That is just an illustration, like Mr. Cochran has said. It is a matter of starting back on the farm and trying to hold the water on the land. That is all I have to say.

Mr. LOVRE. Mr. Frank Feser, of Claremont.

STATEMENT OF FRANK FESER

Mr. FESER. I have a statement which I will read to you.

Honorable gentlemen, I am Frank Feser, from Claremont, S. Dak., president of the South Dakota State Board of Soil-Conservation District Supervisors, member of the South Dakota State Soil Conservation Committee, board member of the South Dakota Reclamation Association, and chairman of the local P. M. A. committee.

In my association with these organizations, I have been able to obtain fairly good concept of this matter of flood control. I am familiar with the present plan of flood control on the Missouri River and some of its larger tributaries.

I hardly care to criticize the present plan; but, in my opinion, flood control should start in the watershed of the streams that contribute to the main stream. I think this should be done whenever feasible. I think the idea of allowing all runoff to enter the main stream and try to control it there is too costly and possibly not the right plan. I think a careful study of all watersheds should be conducted. Water

controlled in the watershed is a benefit to the area and does not increase the problem of control in the main stream. I have in mind a particular example of a tributary of the Missouri River in northeastern South Dakota; namely, the Putney slough area, a tributary of the James River. Putney slough is the result of spring runoff from a series of hills to the east in Marshall County.

I feel certain that a survey would reveal that a number of flood-control dams would prevent any flood condition in Putney slough, which represents approximately 30,000 acres of land in Brown County. The slough proper, under present conditions, is 15,000 acres, with an additional 15,000 acres being flooded every spring. The big problem in this case is that, under flood conditions on the James River every spring, the water from Putney slough cannot enter the river until the river returns to its normal condition; that is, within its banks. This, as a rule, does not happen until in most years it is too late to crop the 15,000 acres of flood area of Putney slough.

I urge that the Army engineers conduct a survey of the hills area to see if a plan of this kind would not be feasible and allow the water to enter Crow Creek drainage ditch, in the capacity that ditch can deliver it into the James River. This plan could be part of the Missouri River development. I am secretary of a committee appointed by the Brown County Board of Commissioners to submit a plan of flood control in Putney slough and the James River in Brown County. The above-mentioned plan is a result of a survey conducted by the committee and presented to the board of commissioners.

I would also like to present my views about the Soil Conservation Service and the Production and Marketing Administration. I have worked with both of these governmental set-ups since their origin, I would like to mention here that a complete soil-conservation plan on every farm, through a soil-conservation district, would be a big help in holding water where it falls, thereby helping out in this flood-control problem. It seems to me that after nearly 16 years of operation of the Soil Conservation Service, together with the State law of permitting soil-conservation districts, have proven their worth in the conservation of the Nation's greatest asset, the soil. I believe that the amount of conservation applied to the soil should not be effected by any economic condition that may be present. I mean by this, that regardless if cattle are 40 cents, hogs 25 cents, and $3 wheat, compared with 18-cent cattle or 10-cent hogs and $1.50 wheat, soil conservation should not be affected. The products produced from the soil have the same effect on the soil regardless of price. Therefore, I am positive that in order to operate 100 percent of capacity, the Soil Conservation Service should not be tied up with any other governmental agency. I am 100 percent for PMA and its functions, with the exception of the soil-conservation payments.

You gentlemen, no doubt, know as well as I do that there has been friction between PMA and SCS and payments administered by PMA is the cause. It is a leverage by PMA to control practice. Under Senate bill 1278, Soil Conservation Service is charged with the administering of soil conservation as applied to the land, in and without soil-conservation districts. The PMA still makes benefit payments and O. K.'s all practices for payment. Does this make sense? No. It is the cause of controversy especially in counties not organized into soil-conservation districts. I have no gripe with PMA, but I do think that the Soil

Conservation Service can administer payments effectively. I think that payments should only be made for practices of a permanent nature; those that effect water and wind erosion. I do not believe in payments that are made for maintaining the fertility of the soil, unless it can be done for a national land capability survey. Classes I and II land need no payments. There is very little of this in the county.

I am not in favor of proposed bill 1149. Let's let well enough alone. Soon we will have a case of the blind leading the blind, and then what? Just review what has happened to soil in some other nations and no little amount of our own Nation.

The increase of 2,000,000 in population yearly in this nation requires an additional 5,000,000 for their food and clothing. We just don't go out any more in this nation and pick up an additional 5,000,000 acres of productive land every year. This means better conservation of what we have. We are losing several millions of acres for production every year on account of water erosion. Certainly this shows the necessity of soil conservation as administered by a soil conservation district. Talk about this nation losing its idea of free enterprise! A soil conservation district is a very good example of self government. The only cost of a district to the Government is the cost of technical assistance. District supervisors are not federally paid. PMA committeemen are.

So, in closing, I would like to leave this thought with you: Use your influence to see that this Nation maintains a well supported Soil Conservation Service operating as an individual agency. The future of the well being of this Nation depends upon what happens to its soil. Let's protect the economy of future generations.

I thank you.

Mr. LOVRE. Mr. Arthur Jones, of Marshall County.

STATEMENT OF ARTHUR JONES

Mr. JONES. Mr. Chairman and members of the committee, I come here just as a farmer. I do not represent any group or any agency. I should qualify that this way, any group other than a group of what I call a voluntary committee. I come from Marshall County, which is up in the northeast corner of the State, along the State line. We are just within this Missouri River area. I think most of us are used to thinking of floods as something that happens down stream. Our area is at the headwaters of the Missouri. My county is the divide. The divide that determines whether it goes to the Gulf of Mexico or whether it goes to Hudson Bay to the north. But we do have a flood problem. It is not as fresh in my mind at the moment as some of you men have been talking about today because we had no floods this year. Back in 1942 and 1943 was our last disastrous flood period in my county. However, I want to say that even up there, in the headwaters of the James River, we had a loss in 1942 and in 1943, and up until 1945, that period of years, we lost about 40,000 acres of crop. In 1944 we were requested to review our flood situation and prepare for the Army engineers a complete report of the situation in our county. I am filing with you today, Congressman Lovre, a report taken partly from that report back in 1944. It is a report that was particularly fresh in our

minds at that time. It has been corrected and brought up to date and we have added to it or taken from it as was necessary.

Part of this flooded area has not been flooded in our county until the last 2 years. And as evidence of the fact that the flooded areas are valuable acres I want to call your attention to the fact that they produce well. We were estimating damage in that period 7 years ago, at $10 an acre, crop damage. Last year and the year before, those farmers, vitally concerned because it was their land, told me that 5,000 acres that has been out of production for 6 years, more or less, produced crops valued above $50 an acre. So it is valuable land there, too.

I, myself, live in the foothills of the Sisseton Hills. To the west of me is this flooded area. To the east of me is this watershed. Waters come from there and they lodge over here. You fellows get the benefit. It becomes a reservoir and holds up waters that otherwise would go right down the river. We are asking and we still think we need some improvement in our drainage system, and the report covers that. However, we know that the waters that leave us, first they damage us, then they move on into Brown County and they suffer damage. And it goes on down the river and more damage accumulates as the water goes on down the river.

Now, soil conservation is the answer and I am conservation-minded, as much as the average of these farmers. I hope not any less than the average. But it seems to me that today the afternoon has been pointed at us up in my county because we are at the headwaters, we are causing some of your trouble way down the river. You know that isn't our water down there. But what are we going to do about it? We almost come up with the answer here today, soil conservation. But look at this purely local situation for a moment. We confirm the idea of conservation practices. We are using them. We have built dams out in these hills. They tell me that there are 75 to 100 dams in these six or seven townships and they dump the water onto the rest of us. I say those dams should do the job. They are going to do a partial job, but not too good a job because they are strictly reservoir dams, and a reservoir dam is not a flood-control dam. Flood-control dams are dams that will fill up in floods and let the water flow out gradually, so it would not exceed the capacity of the drainage system. We haven't yet anything of that sort. We do have these stock-water reservoir dams that are partially effective. They are only as effective as the amount of water that will go into them from year to year, and that amount is only what the dam is supposed to do. What is used for stock water and the evaporation, and that is by no means the total capacity of a flood-control dam. We have got a few that have proved to be failures. I don't know whether the PMA thinks they are failures. They are failures because they don't hold water for stock purposes. Personally, I think they are quite a successful little dam in the way of a conservation dam. Somebody made a survey of that dam. They thought it was a good tight soil under it. When the snow water runs off the dam fills, and about a week later it is empty. The water went into the soil. I think kind of a dam up in our country is desirable. It is a flood-control dam. We have some contour-farming practices. We have a few terrace practices. I have some terraces on my own farm.

I am going to say to you that all of these conservation practices are not going to solve this flood-control problem. This area has always been grassed over. We are keeping that. We are doing that, but snow water doesn't go into frozen ground. Nine times out of ten our snow comes on frozen ground, and all of these mechanical processes, these terraces, they filled up last spring and overflowed. It took a couple of days for the frost to get out and immediately the water was gone. In the summertime they are very successful. But maybe we have more frost than other areas and anyway a lot of these practices are not going to get the job done. Then people to the west of us on those flats get all of the water. They look at us fellows very hard—ought to be solving this thing, ought to be holding those waters up—and they get a little critical sometimes, and forget that those fellows haven't got too much inducement to hold those waters up there. We are using conservation practices, but we can't possibly use enough to get the job done. I don't believe in a good many years that these people are going to terrace all of the land or contour-farm it either. They need some inducement so these people over here who are suffering damage, they look to us, they admit we can't do very much alone, and these fellows are, perhaps, not inclined to do it. What I am getting at is, it is a problem for all of us. Don't point your finger at us and put the blame on us. We can't up there get the job done. We have got Extension, PMA. I can remember when the Extension Service was the only agency talking soil conservation. They were doing a good job of it. Then later PMA. Now we have a district and we try to cooperate with every district. They are doing a sizable job of it. I think they have done a very good job. I am not so sure but what they should continue to make these dams. I don't feel there is any quarrel between them. I think in our county these agencies are cooperating 100 percent.

I say again that you down here cannot handle the situation alone, and we, in our county, can't handle our own situation. We need the dams, and I think the payments today are only a token. Let's look at it this way. I think soil conservation is so important for the national welfare for the future of our people that it is a thing that belongs to all of the people. It should be an axiom that soil conservation is a problem of all of the people. When it becomes a problem of all of the people, I think all of the people should subscribe to the support of it. I am not at all ashamed to take payments for practices that I should be doing on my farm. I think it is important to all of the people. The sooner the people as a whole realize that, I think the better off agriculture and all of the Nation is going to be.

I thank you.

(The following report was submitted by Mr. Arthur Jones:)

FLOOD CONTROL PROBLEMS, MARSHALL COUNTY

This report covering flood control, the extent of damage due to floods and some suggestions for a general lessening of damage due to floods is prepared, using in part some of the data and statistics from a report of the flood-control porblem prepared and presented to the Corps of Army Engineers in January 1944. That report was prepared by a committee of farmers and landowners appointed by the county commissioners of Marshall County. The following information is taken from that report.

"An area of approximately 40,000 acres, extending north and south through nine townships, has been flooded 12 years in the period 1881 to 1943, inclusive.

"The estimated damage per year, in years when floods occurred, was $170,000, or a total of $2,040,000 for the period.

"The area which is frequently flooded lies west of a range of hills which runs north and south across the county, in which heavy snows frequently accumulate. The natural drainage from the hills is westward. When the snow melts, and when heavy rains occur in the hills in the summer, a great runoff develops and flows westward. Numerous creeks flow into the flood area from the east and southeast, some coming in from Day County. These creeks carry a large amount of water and flow rapidly.

"The headwaters come from Wismer, Hamilton, Fort, Waverly, Pleasant Valley, and Sisseton townships.

"The townships in which flooding occurs are: Dayton, Newark, Stena, Miller, Weston, Lowell, Newport, and Hickman.

"Very nearly all of the land flooded is very fertile and highly productive, some of the flooded area drains out after a few months as waters recede toward the river. Other areas that fill to a 5- or 6-foot level may be as long as 3 to 5 years in coming back into crop production.

"The natural outlet from this area is to the James River by two courses, one flowing in a southwestward direction, leaving the county 11 miles from the North Dakota line flowing through creeks and sloughs, and the other is out of the southwest corner of the county across Day and Brown Counties through Mud Creek, which enters that James River near Stratford, S. Dak.

"In years of heavy snow and heavy rains, the natural outlets did not carry the excess water off fast enough to prevent its spreading out and into pockets from which it cannot flow out.

"Conservation of moisture and water is, of course, fundamental in the agricultural development of the county and of primary position in the average farmers' plans and practices, yet runoff water and floods which develop from the lack of control of those runoff waters is, by all odds, the No. 1 problem of the country.

"Flood control then becomes the problem of greatest concern, and has, in fact, because of very widespread crop and property damage, become a problem that has caused genuine concern and alarm in the minds of those farmers and landowners most directly affected. These farmers now confess their total inability to cope with the situation.

"While these farmers feel very keenly their own financial loss, we are also constantly reminded of the tremendous loss to the Nation in terms of potential food destroyed by these floods and in this wartime when so much is expected of all farmers.

"Farmers within the county, of course, are vitally concerned but at the same time, it seems to us that because of the geographic location of the county within the watershed of the James River, that our problem becomes at once the problem of any and all concerned with flood control in the James Valley because under flood conditions, the volume of water and the rapidity of its descent down the upper tributaries of the river is one of the major contributions to flood conditions on the river itself.

"PRESENT DRAINAGE FACILITIES

"At present, the drainage area is served by a rather elaborate system of drainage ditches in addition to other natural creeks and streams.

"A drainage system known as the Newport-Weston ditch begins on the east Newport Township line at the southeast corner of section 13 and follows the section line to a point approximately 30 rods past the southeast corner of section 25 in Weston Township, where it is joined by the Spain drain. The ditch then angles across section 25, Weston Township, and then proceeds due north on the section line to a point midway between sections 35 and 36 of Stena Township, where it joins the Dayton Crow Creek drain, which comes in from the north and, at the point where the two join, a ditch runs west toward the Brown County line.

"The Dayton Crow Creek drain begins in Dayton Township and proceeds in a general south and southeasterly direction to the point where it joins the Newark-Weston drain.

"For the most part, these drainage ditches were planned and constructed in the period of 1915–19 at a time when the area was having trouble with very destructive floods.

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"In addition to these drainage ditches mentioned, there are several or more well-defined water courses, creeks, or streams. The largest of these and the one carrying by far the greatest volume of water is locally known as the Crow Creek. Along much of the course of the stream flood damage is severe at high stage.

"SUCCESS OF DRAINAGE SYSTEM

"Many of the farmers are of the opinion that they have received some benefits from the drainage ditches under average conditions, but it seems to be the unanimous opinion of most farmers that the ditches have been far from effective in times of serious floods, such as those of 1942 and 1943. Failure of the system seems to hinge around the tremendous crest of water that, at flood stage, hits the intersection of the Newport, Weston, and Dayton Crow Creek drain, and that the ditch going west from that point is only one-third as large as it should be.

"The Newport-Weston drain is a ditch with the dirt all piled to the west to prevent floodwaters going westward. Floodwaters have very rarely flowed over the bank, but have rushed around the south and to fill the depressions and much of the lower farm lands in Newport township.

"In this corner of the county, farmers also report considerable floodwater coming in from the south of Day County. This is due to faulty drainage through what is known as Mud Creek in Day and Brown Counties.

"The area served by the Dayton Crow Creek drain has been as badly damaged by floods in 1943 as it was in 1915 and 1916 when the ditch was planned. The ditch was constructed in 1919 and 1920 and at that time was of assistance in draining lands flooded since 1915 and 1916. In 1943, this ditch has now drained off land which stayed under water 5 years in the period 1915 to 1920, indicating some advantage gained by the ditch.

"In general, all farmers and landowners agree that the system of ditches has been only partially effective.

"EXTENT OF DAMAGE BY FLOODS

"The seasons of 1942 and 1943 have witnessed some very disastrous floods with great damage to crops and property.

"The committee has secured some data for the year 1943 from the records of the Marshall County Agricultural Conservation Association's records, which indicate a total of 25,000 acres of cropland either not seeded to crop in 1943 or seeded and then destroyed by floods. Using $10 net per acre, as an estimate of loss, we arrive at a total loss in the townships most affected of $500,000 in the 2 years of 1942 and 1943.

"The figures used here are applicable to land devoted to crop use only, and do not represent any of the loss to pasture and hayland, which is considerable.

"As nearly as we can ascertain, floods of serious proportions have occurred in 12 seasons since 1884. These occurred in years of 1884, 1888, 1897, 1907, 1915, 1916, 1922, 1929, 1937, 1942, and 1943. It is very difficult to estimate losses in those years but it is believed by the committee that losses in these years will total approximately $2,040,000.

"SUGGESTIONS TO GAIN BETTER FLOOD CONTROL

"Farmers and landowners in the localities served by the Crow Creek and the drainage ditches and in the immediate area where the greatest damages occur, believe that definitely the ditch running west from section 36 in Stena Township is too small to handle the floodwaters, and that very much could be gained by a much larger ditch in place of the present one.

"Landowners and farmers of Newport Township these southern floodwaters are diverted north to them and at the same time their own high water is prevented from flowing away by some change which has taken place in the stream and watercourse known as Mud Creek, which flows in a general southwesterly direction. This change may be a natural filling of the creek due to dust and soil laid in its bed by high winds.

"It is the opinion of farmers of Newport Township that Mud Creek has been either by dust and soil carried into its bed by the wind or by some damming by farmers. Farmers and landowners in this area suggest a survey of the flooded lands and of Mud Creek and its tributaries to determine feasibility of drainage in this way. They also point to the fact that any water which can be sent down Mud Creek would eventually reach the James River in the vicinity

of Stratford in Brown County or in other words, would flow into the James in such a way as to avoid the high level of the river at points farther north.

"In addition to these suggestions for improvement, all farmers affected by floodwaters are agreed that there are many possibilities for flood-control dams in the foothills of the hills and that it is entirely possible that flood-control dams could be constructed on nearly every stream and by the use of floodgates, the water could be released only at the rate that existing creeks, streams, and ditches could handle it without creating flood conditions, at any place. Dams of this type would serve the triple purpose of—

"1. Minimizing flood conditions along the course of all the creeks and ditches.

"2. Avoid the flooding large acreages at the convergence of the creeks and ditches.

"3. Avoid rushing and pushing of floodwaters out to the James River and contributing to a still greater flood condition on the James itself.

In general, the farmers and landowners urge that some action should be taken out but at the same time, they feel little can be accomplished through local action."

The preceding data has all been taken from the report of 1944 mentioned in the introductory statement. That portion of the report entitled "Extent of Damage by Floods" should now be brought up to date as some severe crop seasons have now become history since that report was prepared.

We have checked with the farmers of the flood area and find that approximately 35,000 acres of the flooded land was back into crop by 1945.

About 5,000 acres of land remained flooded until 1949 and 1950. Crops from this land which remained flooded until 1950 have produced some crops valued at $50 per acre in 1950 and 1951. The per-acre value of crops raised in the last several years indicate that on the basis of today's values the per-acre loss and also the total loss in flood years would be much larger than the 1944 report would indicate.

SUMMARY

No serious flood conditions have developed over the county since 1942 and 1943. It should however be pointed out that no great change has taken place that would indicate that floods can be controlled in the future.

Farmers as a group are conservation-minded today and as individuals they are using conservation practices which may tend to hold water at or near its source. It must however, be remembered that snow in this area usually falls on frozen ground and soil when frozen is nearly impervious to water with the result that in spite of our attempts to hold water by such practices as contour plowing, stubble tillage, and grass and legume crops much of the snow moisture will become runoff water.

It should also be noted roads have been improved and the road ditches on sloping land tend to hurry off the waters.

Many small dams have been built by farmers and stockmen but these are in the nature of reservoirs and while they catch and hold a lot of water they cannot be operated as flood-control projects beyond the amount of water they save from the runoff. It therefore now appears:

1. Because of increase values of crops today the potential now exists for a much larger loss in this county in the next flood period.

2. Drainage systems are at least as effective now as they have been in the past, but no change has been made to them that would tend to make them more effective in the future.

3. Effective drainage in this county will always tend to make for a greater damage on the James River until improved drainage is accomplished there.

4. We still feel that flood-control dams large or small or both in the hills in Marshall County can accomplish much control.

5. Farmers and landowners will do much to solve our problems, but outside assistance on a State or national level is necessary to accomplish results.

We have used the data from the 1944 report because we feel that a great deal of study had gone into the report and that it included the considered thinking of numerous farmers and landowners. The experience of more recent years only adds to the value of the data assembled at that time.

We submit this report for your earnest consideration.

ARTHUR JONES,
Chairman of 1944 Flood Committee.

Mr. LOVRE. Mr. Kenneth Randall, of Shenandoah, Iowa.

STATEMENT OF KENNETH RANDALL, SHENANDOAH, IOWA

Mr. RANDALL. Mr. Chairman and members of the committee, my name is Ken Randall, from Shenandoah, Iowa, managing editor of the Iowa State Watershed Bulletin. I represent the Iowa State Watershed Association. Most of what I have here in my written statement has already been said, but I do want to bring a little different approach to the organization. The major objectives of the Iowa Watershed Association is to assist National, State, and local organizations, particularly soil-conservation districts, in a coordinated program of reducing soil erosion, retardation of floodwaters, and reduction of sediment. We have heard that time and time again today. I think we all understand just what that will do. Already, I think, in Iowa, we have organized our watersheds into coordinated groups and we have started our own publication. We are sending this publication to a circulation list of 6,000. We carry this soil-conservation program that way. I think we are accomplishing a lot. It has been amply demonstrated by soil-conservation work on small watersheds along the Missouri River that water runoff can be reduced by good soil-conservation practices and good land treatment as much as 75 percent. An example of stopping water where it falls and reducing sedimentation is the Johnson Run watershed at Shenandoah, Iowa. The Johnson Run watershed has been treated with conservation measures that have been applied for at least 4 years. Prior to that time floods caused damages as high as $200,000, but since treatment the damage has been negligible, and the stream flows serenely to its mouth. In many other watersheds throughout Iowa, as well as in surrounding States, groups of farmers, with the aid of the Soil Conservation Service, are applying soil-conservation practices as rapidly as they are able, and in many small watersheds from one-half to three-fourths of the land treatment is completed. However, the treatment of gullies and channels is usually beyond the financial ability of the individual farmer. Small detention structures to temporarily hold water, channel straightening, and similar practices have not been attempted by farmers, both because of the cost as well as lack of engineering assistance, and these measures for flood prevention are why farmers are asking appropriations from Congress to complete. Farmers are willing to bear a portion of the cost because they will reap some benefit themselves along with the benefits downstream. Thus, soil conservation practices applied by the individual farmer is the first part of a program of flood prevention. The second part is the construction of small retarding and retention structures and small channel works of improvement. These two parts are what we know as upstream flood prevention.

The Iowa Watershed Association feels that large reservoir construction along the main stream—the third part of the complete coordinated flood-control program—is ahead of the treatment on the land. In other words, the cart is before the horse. Funds available for land treatment and small-watershed protection have been insufficient to keep pace with the construction of large dams. We feel it is imperative that the agricultural flood-control program should be immediately stepped up in order to catch up with the construction along

the major channels. The upstream work will not only conserve the soil and increase production, but will hold the water and reduce the flow in the main stems. Also, it will prevent the sediment from piling up in the stream beds and silting up the large concrete structures. The treatment of the farm lands on the small watersheds increases production of food so badly needed in our defense program, and for our increasing population. Furthermore, soil conservation practices increase the water holding capacity of the soil, keep the small tributaries flowing longer, and thereby increase the flow of clean pure water available for industry and other purposes. A quote from a survey report of the Missouri River watershed, authorized by the 1936 Flood Control Act, bears out the previous statement.

Reduction of damage to land, abatement of flood and sediment damages, and continued maintenance and improvement of the land and water resources of the Missouri River Basin depend upon the proper integration and the timeliness of installation of practices and measures recommended in the report. The land in a watershed should be used and treated with conservative practices in such a manner as to develop the most favorable condition of infiltration, water storage, and yield of agricultural products. This favorable soil condition will retard a maximum amount of the rainfall consistent with the use of land for productive purposes and will reduce the rate at which runoff will reach the waterways and tributary streams. Stabilizing measures for small watercourses are needed, therefore, to temporarily retard the damaging runoff so that it will pass through the minor waterways and tributaries and channels without overflowing the bottom lands. Moreover, these waterways and channels must be protected to prevent destruction of adjacent land by erosion of unstable channel banks and bed. Furthermore, the stabilizing measures recommended are essential to the protection of the reservoirs that are subject to seriously high rates of silting.

Then there is another angle I don't believe has been touched so much today. That is, as regards industry itself. The importance to the community, to the town and to industry. Probably industry is as much concerned as are farmers with soil erosion and recognizes its importance. Pipeline companies, railroad, and the American Telephone & Telegraph Co. are spending thousands and thousands of dollars to protect their rights-of-way and their underground lines that cross farm lands. These companies, in cooperation with the farmers, are building waterways, terraces, and structures on farms without cost to the farmer to protect their lines and investments.

In conclusion, the Iowa Watershed's Association urges this committee to give favorable consideration to the authorization of reports for soil erosion prevention and water flow retardation in small watersheds. Also, the association will appreciate the influence which you may have in getting appropriations to initiate works of improvements for flood prevention in small watersheds. We recommend that the work on small watersheds be done by the Soil Conservation Service, working with farmers through their soil conservation districts. The Soil conservation service has experienced and trained personnel to do this kind of work.

Now, it was said, departing a little from this watershed idea, they were talking this morning about the difficulty in educating farmers in soil conservation practices. It is pretty hard to take a farmer that has been farming 240 acres, and that has been probably 150 to 175 acres of corn or grain, to go out and tell him to cut that down about 80 acres. That is a pretty big jump. It takes a little while to work that into the program. This matter of education, once it is accomplished, you will find will do a lot for soil conservation.

Then there was the problem of the tenant farmer. My answer to that is to get them on a long term. Instead of having a tenant on a year-to-year basis, let him have a 5-year lease, and over a 5-year period of time the tenant is going to have a stake in there and will probably stay a lot longer than 5 years. On a year-to-year basis he can't see building terraces. He can see in 5 years the benefit of it.

I thank you.

Mr. LOVRE. Mr. Harry Martens, of Wessington.

STATEMENT OF HARRY MARTENS

Mr. MARTENS. Chairman Lovre and gentlemen of the committee, I am Harry Martens, a farmer in Beadle County, living north of Wessington which is in the northwest corner of the county. I have lived there since 1909. I deem it a privilege to testify at this hearing.

Since the Beadle County Soil Conservation District was organized in 1942, I have been a supervisor and at present am chairman of the board of supervisors.

When the district was first formed, our problem was mostly erosion caused by wind during the dry thirties. At our first meeting we were quite concerned as to what practices to use to get grasses and legumes to cover our bare soils.

What I hope to bring out here is how our soil conservation district program will help to prevent the disastrous floods which cost landowners and citizens great amounts of money. There is the need to help prevent silation of large dams which require large Federal appropriations to build, and there is no doubt in my mind that these are very necessary in the prevention of flooding and in turn to provide water for power and irrigation. The smaller dams and dugouts built by districts hold water back in smaller bodies, but may be very effective in the overall flood problem. So our program is to hold water and snow where it falls.

This is done by various practices that cooperators of the district carry out. First by leaving a cover on the land, returning all straw and working same into the soil which increases the organic matter. Cooperators use various types of machines such as duckfoots, oneways, wheatland plows, disk tillers, and chisel-type machines.

These practices are sometimes called residue tillage. The residue on the surface tends to split raindrops so there is very little splash erosion; therefore, more water penetrates the soil.

Proper grazing or pasture management also tends to hold water where it falls. To do this the district stresses proper stocking to prevent overgrazing which in turn makes better grass and leaves more residue on the surface.

Improved crop rotations, using more grass and legumes, improves tilth of the soil by adding organic matter. This higher content of organic matter acts like a sponge to take water in more readily.

These practices and others supported by contouring and dams for livestock water in our pastures, terraces, and contouring on sloping land all tend to hold water, thereby eliminating flooding those below.

Districts are working for a more permanent agriculture. Each cooperator's soil is classified to find its needs so that proper management will be brought out. To do this districts get technical help from the Soil Conservation Service. Soilsmen make soil surveys. Conserva-

tionists assist the farmers in developing conservation plans, which are an agreement between the farmer and his district.

To my way of thinking this is approaching the job where the problem begins—right on each individual farm in their soil conservation districts, locally administered and a program set up that meets the needs of every farm in his district.

It would be hard to put an exact figure on the amount of water impounded on the 625 district cooperators' farms in Beadle County. Through their participation in the conservation program, there have been 137,000 acres tilled to leave residue cover on the soil. There has been work on over 73,000 acres of pasture toward better management. Over 200 dams and dugouts have been constructed. Nearly 1,000 acres of trees planted for farmstead protection. Nearly 15,000 acres have been seeded to legumes and grasses. All these and many other practices that the cooperators of the district are putting into effect will do much to hold back the floodwaters. Our program is merely begun. We have much more to do to get every farmer following a complete conservation soil and moisture plan for his farm.

Mr. LOVRE. Mr. M. J. Minnehan, of Ravina.

STATEMENT OF M. J. MINNEHAN, RAVINA

Mr. MINNEHAN. Chairman Lovre, we have all kinds of flood problems here today, and erosion. I believe we got something here that has got them all beat. What we call Seven Mile Creek. It backs up 7 miles from the Missouri River. It is in south central Charles Mix County. We have about 7,000 acres of watershed. About 2,000 acres of this is farm land, or about one-fourth of the total acreage, and that concerns about a dozen farmers. This particular creek is a little different than the most of them. Not only erosion down the creek, but we are getting back erosion. We get it when the creek goes down and when it backs up. I got one neighbor, his buildings are getting endangered. It is close to his barn and it keeps backing up and caving off. The gullies are 15 to 20 feet deep now. There is very little soil conservation work down in that locality. I have got my own farm all terraced. I started it first. We went on contour first. It didn't quite do the job so then we went to terracing. In 1946 we started to terrace. Now, I have got my farm all terraced. Probably 5 or 6 miles of terrace. Talk about slowing up water. I went out on the farm after a bad rain, a heavy rain, and those terraces were standing with 12 or 14 inches of water in them. I guess the original depth of the terrace is supposed to be 12 inches, but when they are first built they are higher than that. Five or six miles of terracing, take the whole country over, what that would do in the way of flood control.

If any of you were ever by the Fort Randall Dam you would have an idea of what the bluffs are around there. The head of this creek is about 5 miles east of this Fort Randall Dam. With this shale under the soil, it varies from 3 feet up to almost the top of the ground. It will have a grade of probably 25 percent. We had in mind there if we could get some aid there to put in dams or dikes or something to stop this back-up. It is about as bad as the erosion down. We can't do it alone. It is too much of a job. Too much work for what we have to work with. If we could get some financial aid, Government aid or some kind we would sure appreciate it on our own farms. This one

gully that runs into this Seven Mile Creek is backing up into my alfalfa field. This last spring it backed up about 4 rods. It won't take long for it to go clear across that field. That is going to be very bad in time. It isn't only mine, but the neighbors' fields. It goes back to several others. Take this shale under the soil, you might think it is poor soil. It is not. It is fully productive soil if we can check this wash.

If some of your committeemen sometime happen to be around Fort Randall Dam, I extend a personal invitation to come over and inspect that. I think it is one of the worst in South Dakota.

Mr. LOVRE. Thank you, Mr. Minnehan. We will be very happy to make an inspection if we get out there.

Mr. MINNEHAN. Thank you. I will be very glad to have you come out and will show you around and give you the best we got.

Mr. LOVRE. Mr. George Gilbertson, of the extension service, State College, Brookings.

STATEMENT OF GEORGE GILBERTSON, EXTENSION SERVICE, STATE COLLEGE, BROOKINGS

Mr. GILBERTSON. Mr. Chairman, because the summary, conclusions, and recommendations of the South Dakota Reclamation Association corroborate testimony previously presented, I shall file these conclusions with the committee without oral presentation.

Mr. LOVRE. They may be filed and will be given full consideration by the committee.

(The information referred to above is as follows:)

SOUTH DAKOTA RECLAMATION ASSOCIATION,
Rapid City, S. Dak., November 1, 1951.

The South Dakota Reclamation Association is an organization composed of farmers and businessmen interested in the sound development of two of the basic resources in the State—land and water. This organization was 14 years old this September. It can point out to you, if necessary, many worth-while accomplishments.

Our association has always supported the Corps of Army Engineers and the Bureau of Reclamation in their work under the so-called "Pick-Sloan plan." We have criticized some of their procedures from time to time, but in the main have given them our full support. We, however, realized from the beginning of the program, with the passage of the Flood Control Act of 1944, which gave these two Federal agencies authority to develop flood control, navigation, irrigation, hydroeleitric power, and related water uses, was not a complete and comprehensive river basin development, because it left out the development of the agricultural resources.

The association at every opportunity deplored the fact that proper agricultural development did not have a part in the program, and has been doing everything it can to make our people and the Congress conscious of this fact.

We therefore, welcome this opportunty to present our views.

We believe House Document No. 373 should be passed and appropriate funds supplied at once, for the following reasons:

1. The engineering works of both the Corps of Army Engineers and the Bureau of Reclamation are now far ahead of the program for the land.

2. Costly reservoirs need protection from sediment. It will give them longer life and therefore increase their benefit to the people. This protection is possible only by a program for the land.

3. The agricultural program complements the work outlined in the Flood Control Act of 1944.

4. This agricultural program will enable people of the State and basin to take advantage of the opportunity given them under the program to arrest erosion and end depletion of their soil, and to improve their resources in land and forests.

I wish to cite to you an example of what we mean. The Shade Hill Dam on the Grand River was built under the Pick-Sloan plan. This dam is fed by two branches of the Grand River, one originating in South Dakota and one in North Dakota. The dam will hold any flash flood coming down either branch, but this structure does not in any way correct soil erosion. The flash rains still continue to erode the land and carry it down the tributaries into the dam. What was needed, even before the dam was built, were protective measures, such as small dams, dikes, spreader ditches and water-holding devices of all kinds, up and down both tributaries. Such a program would hold the water where it fell, giving it time to saturate the soil, and allowing it to run off gradually so as to prevent soil erosion and gully cutting, and then when it—the water—finally reached the Shade Hill Dam it would be clear of practically all sediment.

This example is but one of many in the entire basin, and is a direct result of having no agricultural development program.

We feel that this program will enlarge the benefits the Nation can rightly expect from our increasingly large investment of public money in dams, reservoirs and high-cost engineering works in the basin.

5. This association realizes that the ownership pattern in this basin may be somewhat different than in other basins. We are told that 79 percent of the land in the Missouri River Basin is privately owned. We recognize that the Government does not operate directly on privately owned lands. We firmly believe that the farmers and ranchers, by and large, given help and encouragement, will carry out the corrective practices advocated in the program.

6. There is nothing new suggested. The principles are all time-tested. Farmers and ranchers know about them. Some farmers have already put into practice many of the recommendations. They will be accepted at once.

The program is comprehensive. It insists on and encourages farmer participation, which in itself will assure its success. It starts with the development of each small tributary basin. No farmer, therefore, will be left out and so will feel his importance in this whole program.

We list here nine major programs we approve and are found in House Document No. 373.

1. A program of conservation and improvement measures for grassland and cropland.
2. A program for forests and forest range lands.
3. A program for stabilizing measures for small water courses.
4. A program of aid in irrigation.
5. A program to improve drainage on agricultural land.
6. A program of soil surveys and land classification.
7. A program of research and investigation.
8. A program of extension education.
9. A supporting credit program.

Since this agricultural program embraces the agricultural measures and activities required for the full and efficient development of the land resources of the basin, and

Since it is designed to balance and compliment and support programs of flood control, water power, generation, navigation, and other purposes.

We urge the early adoption and acceptance of House Document No. 373.

SOUTH DAKOTA RECLAMATION ASSOCIATION,
A. M. EBERLE, *Past President, Brookings, S. D.*

Mr. LOVRE. Mr. Malcolm Ronald, of Mitchell.

STATEMENT OF MALCOLM RONALD

Mr. RONALD. Mr. Chairman: I have a lengthy statement here but I am not going to read it. I am going to make a few remarks to perhaps encourage the committee to think it will be worth reading when they have time.

I would like to say I am here not as a newspaper editor, but as president of the Associated Missouri Basin Conservationists, which is an organization with members from all over the States in the Missouri Basin. I would like to present the viewpoint of this group.

Conservationists have come to be thought of as rare, high-minded people who are concerned about passing our natural resources along to their grandchildren in good condition. I think that concept of conservationists is as obsolete as a model T Ford. Today the conservationist is concerned with problems that face us today. For one thing, if we dig deep enough into the wars of this century, you will find the driving force for violence comes from hungry people, or those who fear they will be hungry. Conservation hasn't anything to do with grandchildren, and in the Missouri River Basin conservation becomes doubly important, and doubly important in its consequences. About one-third of the Nation's food supply comes from 10 States in the Missouri River Basin. This problem is not for our grandchildren. It is for us. This is the thought that we must bring to developing the Missouri River Basin. It is an agricultural area and it must be developed as such. There has been a certain tendency to say, among the witnesses here, oh, yes, we are for the Pick-Sloan plan, and we want to see the water held on the land as much as possible. Some of the witnesses this morning went into the question of research; that we must get the facts in our soil-conservation approach. And that, gentlemen, brings me to what I think is the issue. That brings us immediately into a head-on collision with the political angle. I am not referring to public politics, as between Democrats and Republicans. I am referring to Army engineer politics, Bureau of Reclamation politics, United States Department of Agriculture politics.

You heard a witness this morning state that he had shivered when he heard John Sloan say you can't have your cake and eat it too. When you hold the water on your land you won't have it in our dam. That is the issue. You are not going to have both. The Army engineers and Bureau of Reclamation are interested in hydraulic projects, and will only be a stranglehold on the development of the program in the Missouri Basin. These agencies want to build their work dams at a cost of $6 billion. The $6 billion is the cost of the dams and all of their multipurpose ramifications. But this is an agricultural area. They speak of getting industry in here. We have a big share of the biggest industry in the United States, many times bigger than the automobile industry and steel industry together; agriculture. The organization which I represent feels that by getting representatives from all of the States to present this viewpoint, something can be accomplished. I have here these documents. After the disastrous flood in Kansas I received a letter from Fred J. Knapp, chief editorial writer of the Daily Free Press, Newport News, Va., wanting to know what is this thing all about. So I wrote him a letter and I sent him a statement of policy made by the AMBC at their meeting held in Sioux City last August. Also a statement of the year before held in Mitchell. These three documents present the viewpoint of the AMBC, which feels that it is time to insist on developing this area right. We are afraid of the Bureau of Reclamation and the Army engineers. We contend, and we document it with proof, that they are utterly irresponsible, that they are not interested in the best welfare of this area. I might say we are not interested in being fair to the Army engineers or the Bureau, or, for that matter, to the Department of Agriculture. We are more interested in being

fair to the United States of America, which actually faces a severe threat to its future food supplies. Frequently the interest of the area of South Dakota and other States, and the interest of the Nation coincide, and that is the group to which we wish to be fair, and we hope that you gentlemen, in your legislation, will see to it that the Missouri River Basin is developed as it should be, as an agricultural area, by beginning with holding the water where it falls. We don't claim that that will abolish floods, but it will tremendously reduce them. It will cut down the size of the reservoirs needed. So we insist that the problem should be attacked correctly instead of backwards as it is done under the Pick-Sloan plan. I would like to leave these documents with your secretary. Thank you.

Mr. LOVRE. Mr. Ansel Bailey, of Mitchell.

STATEMENT OF ANSEL BAILEY

Mr. BAILEY. Mr. Chairman, I am a farmer and I don't represent any group, just myself and my farm. I have been listening all day pretty good. The trend runs pretty much in our area of keeping water back on the land. I make a habit of going about twice a year down to Randall to see how the boys are getting along. On the way down there I observe what is going on. The thing that strikes me is, what are we doing about keeping the water back on the land. I heard a lot about it here. I can't see any evidence of it. I am not sure the boys are going to get the dam done before 30 years are over. At the rate we are going, if we are going to keep the water back, how do we know it won't be 60 years. I am just wondering if we are not just building a large waterfall on the Missouri River. I have lived alongside of it quite a few years. I have seen it go empty several times. I could wade across and not get my hair wet. If we don't do anything to stop the silt going into the Missouri River, we are going to spend an awful lot of money pumping out the dam for a place to put the water if we don't go to the cause of it. And that cause lies back on the farm. That gets us around to the county where I live without a conservation district. We have a Government agency opposing a conservation district, which it would not hardly sound like it could be. There we have two of them by the same father. One boy is fighting the other boy.

Mr. LOVRE. What agency is that?

Mr. BAILEY. PMA agency fighting the soil-conservation district. We have one on every side of us but we don't seem able to convince people in our territory that PMA has been the predominating agency there. Now, we would like a soil-conservation district. We have the Jim River going through our county and a lot of erosion going on there. We would like a district and we are at a loss why we should have a Government agency paid by the same taxpayer trying to discourage a district.

I have heard a lot about all of this Missouri River development and I think some of it has merit, but I think our approach is just a little wrong on it. I believe it would be fine. I have visited the western part of the United States and saw lots of dams that furnish cheap electricity. That is something we have to think about before we build a dam, is our dam going to fill up? In Boulder, I forget how many thousand tons a day accumulate into that dam. That is in a rock soil

out there where the erosion is not near as bad as it would be in our territory. They say the water passing Yankton, S. Dak., is one-half of 1 percent silt. If that is true, I wonder how long it will take for the dam to be filled. If we are going to have this agricultural approach to it figured out in 30 years, we are just going at the thing wrong. I think this committee out here today can gain a lot from that plan if they will study it. Maybe the Pick-Sloan boys even thought of that. I am just wondering if we are not wasting a lot of the public's money.

Thank you.

Mr. LOVRE. Mr. George Hoyt, of Ethan.

Mr. HOYT. I am going to pass. Mr. Ronald and Mr. Bailey stated my sentiments about conservation, so I am going to pass.

Mr. LOVRE. If you would like to file a written statement we would be very happy to receive it at any time.

Mr. HOYT. I didn't prepare any statement. I didn't know about it until last night.

Mr. LOVRE. Mr. Clarence Quickstad, of Watertown. Let the record show that I have a letter from the president of the Watertown Chamber of Commerce, authorizing Mr. Quickstad to appear and testify for the Watertown Chamber of Commerce.

STATEMENT OF C. O. QUICKSTAD, WATERTOWN, S. DAK.

Mr. QUICKSTAD. Mr. Chairman and members of the committee: I am also appearing for the Codington County Association. I am also a member of the association of which Mr. Ronald spoke a few moments ago.

Before I go into what I have in this brief, I wish to say that I worked until 2 o'clock this morning to get this thing written and all of the thoughts didn't come to me then but they have come to me today.

First of all, what is conservation in the general sense? Meaning not only soil and water, but even human conservation. The essence of conservation is self-restraint, and if you wish to add a few more words to it, you should also add the words, "self-restraint for a sustained yield." That definitition of conservation is better guidance for this Nation. I want to mention a few things that have not been mentioned here today.

I wanted to mention also another thing. That if this committee had the opportunity I would suggest that it would be a benefit to you if you could visit the Muskingum and Maumee Conservation Districts in Ohio. The Muskingum is at Dayton. The Maumee, I don't know exactly where it is. The Maumee started in the early 1920's. The Muskingum got started in 1932. The Muskingum Conservation District was headed by Dr. Arthur Morgan, who was at that time an engineer and professor at Antioch College. Later he became head engineer in TVA. Later on, I understand, he was fired by President Roosevelt for some reason I cannot now recall. In starting up the Muskingum Conservation District, he did the same as Engineer Ladue did in Maumee. He told people first of all that there would absolutely be no possibility of conquering floods of these two watersheds unless we first go into conservation to hold the water and plant trees, plant trees until our elbows ache. The people could not see it at first, but

they see it now. He put a plaque on the dams in the Muskingum Conservation District on which it was stated that these dams are for flood control purposes only. Any attempt to use them for reservoirs will be a menace to the city below. They have big gates on them where they can hold more floods if necessary. On the Maumee I understand there are no gates, but they have what the soil conservation speaks of as "trickle type". That is an automatic outlet so that when water gets up to a certain point it starts running out no faster than the stream can take care of it. They have found there over the years that in practice the lands that are flooded back of their dams will dry up in sufficient time so they can still use it the greater part of the time.

What has occurred in the Muskingum Conservation District? They are even making something like a net profit of $100,000 a year. It was reported to me by letter recently that Gen. Lewis Pick sent a group to Muskingum Conservation District recently, and they combed the books since the beginning and they were well-satisfied.

I want to also mention that no statement has been made here today about underground water. A recent speaker spoke of building small dams where the water doesn't stay in the dams but goes down. I think that is all right. I say "Amen" to that. I wish I had a picture here to show you the underground gravel and sand-bearing strata that exists in the Big Sioux River. All of the way from about 30 miles north of Watertown clear down to Dell Rapids up here, there is a continuous run of from 10 to 25 feet depth of sand and gravel. That may be from 2 to 5 miles wide. They hold so much water that they support the city of Sioux Falls. On two occasions in the last 2 years I have taken a leading part in keeping engineers from straightening out the Sioux River on the strength of saving this water base that would otherwise be dried up. The State geologist has stated in a report to the city of Sioux Falls if it were not for these sand and gravel beds, Sioux Falls many years ago would have found a want of water. Straightening rivers is one of the faults of engineers.

Then there is another thing not outside of my province I wanted to mention from the income tax angle. Farmers since 1948 are not permitted to depreciate any earthen works, like earth dams or ditches. I am a certified public accountant and I prepare income-tax returns. I have depreciated earthen dams for years back on the basis that they will deteriorate just as any other structure will, but there was an agreement made between the agricultural colleges and the Bureau of Internal Revenue wherein the earthen structures were omitted from depreciation schedule. I think, myself, that is wrong. Earthen works will deteriorate just as well as other buildings. The Bureau claimed that a farmer can fix up these works himself—these structures. You have heard today that technical assistance is necessary. Not only is technical assistance necessary for the equipment necessary to build a small dam or build a small ditch is not of a kind a farmer generally has. Sooner or later he will have to renew it. If this committee can offer any suggestions to the other committee on taxes that would be a boon to the farmers and support them in building more of these conservation structures.

Mr. LOVRE. I am very much interested in that. That is not considered as a capital asset.

Mr. QUICKSTAD. Yes, it is considered as a capital asset but you can't depreciate it. That is part of the cost of the land. If you bought a

piece of land costing $1,000 and put a $350 dam on there, then the cost of your land would be $1,350. In the meantime if you had had that dam for 20 years you should have it fairly well depreciated. You can do that with a concrete structure or wooden structure, but you can't with an earthen dam. There is a bulletin I can send you on that. It said earthen works are not considered depreciable. It is a capital asset, all right.

I want to mention another thing that was brought up a little while ago that we don't always thing of—the silt in these Pick-Sloan reservoirs. Do you know, Mr. Young, out of 100,000 acre-feet of storage water, how much is set aside as silt? Is it about one-third?

Mr. YOUNG. No, sir; I don't know what it is.

Mr. QUICKSTAD. I asked an engineer how much a fellow should figure on and he said on an average you can figure one-third. I think the dams above Yankton contemplate, under the Pick-Sloan plan, to hold 75 million acre-feet. Let's strike a figure of 100 million. One-third of that is for silt control. As I remember it Oahe is to be either 142 or 192 feet high. One-third of that would be a little bit more than one-third of 142, and you would have over 60 feet depth of silt at the dam when they are fully silted. Oahe dam is supposed to go back 250 miles. You start with 60 feet and end up with nothing. At least an average of 30 feet for 250 miles, of silt. If that silt were kept on each man's farm, you can easily see how much more valuable it would be there to him than in the Missouri River.

The second point I wish to make is in the minutes of one of the meetings of the Missouri River Interagency Committee, Mr. Sloan gave 53 parts per million; 53 parts per million is the same as half of 1 percent, which would mean that in 200 inches up and down you would find 1 inch of silt. One-half of 1 percent on this 100,000 acres of storage would be silted up each year. That would indicate in 200 years it would be completely silted. If we are counting on one-third it would be around 33 years, if I have got my figures right. But you can't count on one-half of 1 percent. I have asked over and over again and I have never heard anybody give that percent. What are we going to do when the one-third silt storage space is used up? From then on, conservation, water for hydroelectric power, for irrigation, will be gone. You will also get no good flood control. There is no known method at the present time, as far as I know, to get that silt out of the river. The cheapest way would be to dig another channel for the Missouri River. It may be they can figure out nothing about how to get the silt out of it. I am bringing this out to show that this agricultural program is the proper thing, because you start holding the silt back on the farm by the man who has got the soil in the first place. This way you are transferring it to the United States Government.

Right in that line I also want to bring out that fact, that a good share of the cost of this agricultural program goes into improvement on the farm to which some owner has a deed. It will not revert to the United States. That is a tremendous difference there between this program and the Pick-Sloan program. In the Pick-Sloan program you have more and more going to the ownership of the United States. In this one you have more and more going to the ownership of the individual.

Then there is another thing that has not been mentioned here today. It was brought out a couple of times at our meeting in Sioux City in August. It is time we start thinking about how far must we be going in encroaching upon the river below. I can't tell you how far we can go and must stop, but it is time to start thinking about it. Right here in Sioux Falls I helped quash the Army engineers program last April where they wanted to come again when they heard there was a flood in the area right north of Sioux Falls, where the Army engineers in the first place, in 1942 and 1943 placed an air base. They put it right down in the river bottom where the floods came this year. There is absolutely no sound reason for such a thing. We are going to have to study how far must we go into these river valleys. I have heard people here today telling us how much they lost. There must be a stop to this some place. I don't know where it is.

Now, I think I will get into the main part. We are not in position to evaluate the cost of this program. The program has been stated as being a $3 billion program. It is an $8½ billion program. If you will look on page 7, H. R. 373, you will find 3 billions of Federal money, half a billion of State money, and 5 billion of farmers' money, owners and operators. The owners and operators are putting up 5 billion out of their own pockets. In the meantime you will find the Secretary of Agriculture preparing for loans to be made to farmers so they can go ahead. So let's get the record straight and don't say 3 billion when it ought to be 8 billion. The cost of 8½ billions on 354 million acres of both crop land and range land, including 72 million acres of public land, will average $24 per acre, to be spent in 30 years, or 80 cents per acre each of those 30 years. I asked the county auditor in my county to get an idea how much can a farmer stand in paying this over the 30 years. I asked him how much are the usual taxes here, per acre, in Codington County. He gave me a figure of $1.25 as an average. The lowest was 40 cents and the highest about $1.75. So it appears reasonable to me from the total amount to be spent and from the total acreage to be covered that it is justified.

I think H. R. 373 calls for only 100 million for the first year. I imagine that will be stepped up. Even if it is a dollar an acre or 354 million each year, it would not be such a staggering amount. Because of the urgent need for this Missouri River Basin program I think it is a reasonable thing. I am for it 100 percent. Only where are we to get the funds in view of the terrific debt and war conditions. And in that connection, I have it in this report, we will never have satisfactory soil and water conservation until we have international peace. One of the greatest factors in soil erosion at the present time is neither wind nor water. It is $2 a bushel, caused by war programs. In our own county, you can on farm after farm see plowed up land that never was plowed before. I have found one place where they fairly plow clear down to the water's edge of the lake. They are forced to do so. The high taxes compel them.

I want to say also I have heard very much about holding the water back. Very little has been said about holding the soil back during the dry years. To my mind this program is of more importance to conserve soil in the dry cycle than it is to conserve soil from flood damage. For 11 years rainfall from normal went down in a big swing. For another 11 years it went up. There is every evidence that

we are running into a dryer cycle than we have seen behind us. For many years of war we haven't taken care of our soil as we should have.

I want to call your attention to the fact that under the Pick-Sloan plan the irrigation of new land covers only 4.9 percent of the crop land, and 1.5 percent of the entire land in the Missouri Basin. This is very important. The benefits, in other words, of the Pick-Sloan plan goes to a very small minority of the people on the farms. Then, in addition to that, I should add 1,800,000 acres of land between Sioux City and the mouth would be relieved from floods under the Pick-Sloan plan. You have only 2 percent of the land in the Missouri Basin that will benefit under the Pick-Sloan plan.

This plan covers practically 100 percent of the land. It is one of the fine phases of the plan.

It was only a year ago that John Eberle of the South Dakota Agricultural College, at Brookings, stated to the Missouri Basin Interagency Committee that with this agricultural program he could see a possibility of doing more damage to the agricultural program than good from the Pick-Sloan plan. I agree with him. When the silt is to be reduced in the Missouri River by these dams, the water will be lighter. The silt weights about 2.65 times water. The water would be lighter and therefore it would flow easier. The speed of flow of any fluid depends upon its own weight. Below each dam you will find hereafter—this has never been told by anybody—I am bringing it up now for the first time, to my knowledge, below these dams on the Missouri River the river will start cutting, scouring.

It is one of the purposes of the Pick-Sloan plan to provide navigation. They haven't told you it is going to scour clear back to Gavins Point. They have told you they want to spend $50 million to do more work between Sioux City and Yankton. The purpose of that is to take care of some of this scouring. There is a law stated in 1802 by the first geologist of this time, that a river system is so delicately adjusted that the tributaries never come too high or too low when they meet their master stream. If they didn't there is no stream in the world that would not start to cut or fill up. Specifically in the Missouri Basin we can expect increasing erosion of all the lands below Gavins Point to St. Louis, and similarly in case of dams on its tributaries. It will deepen the channel. Then every tributary will deepen its channel. That means the Jim at Vermillion, the Big Sioux, the Floyd, the Little Sioux. I can't name them on any further. A dozen of them on the western boundary of Iowa, and all of the rivers we have in the whole Missouri Basin. Then you have more rivers down in Missouri. They will start cutting to get back down on the same level as the master stream. When the tributary cuts then the master stream will cut, and so on. We are going to have more erosion of the land where the plow and hoof touch the soil under the Pick-Sloan plan that we have had before. I have documented that in this report on page 3. If you will read page 80 of the physical geography, by Longwell, Knopf, and Flint, all of Yale College, you will find that the Colorado River, after the Hoover Dam was built, suffered considerable scouring below that dam.

Then there is another point. In the book on Applied Hydrology, Linsley, Kohler, and Pauljus, 1949, it is stated that the flow of water, this smooth flow, is the kind of a flow that you will find going through the reservoirs. Turbulent flow is when it goes rolling over. This

is the kind you have in most rivers due to their silt content, and rocks and gravel and bank configuration. Above these reservoirs the water will be way back into tributary after tributary. That will include the Big Sioux, Cheyenne, Moreau, and Grand. All of those will go into those reservoirs and start flowing faster the minute they get into the reservoir. So you are going to speed up the water in the tributaries from there on up. We are going to have more erosion of the land under that program than we ever had before. We may embark on it now, but I don't know whether we can ever stop.

Army engineers will tell you they are stopping erosion. They have purloined the name erosion from the Soil Conservation Service. They have twisted it to mean something else entirely. They talk about cutting a bank. That is all they are going to stop. They are filling the bank up in South Dakota anyway. What are they worrying about erosion away off? They are going to have all of the river banks covered up by deep water. The erosion I have referred to is where we don't have these reservoirs. They are not worried at all about the erosion up in the field and pasture. Erosion under this agricultural program is an entirely different thing than the erosion the engineers have been talking about.

I am sure most of the agricultural program has been touched upon by several speakers before me. I just want to recall it in this, in connection with irrigation. I would like to see the Department of Agriculture get into the seat of power and steer this basin program so as to keep those two other agencies within reason. If the agricultural program had been in operation, Shade Hill Dam would not have been built in South Dakota. We now have Shade Hill Dam built at a cost of $5 million on the Grand River. It was supposed to irrigate 10,000 to 13,000 acres. That is what Congress authorized it for. In April 1951 the Reclamation Service announced at Yankton at the Interagency Committee meeting that it was about completed. Today it is completed and in all of the newspaper clippings you will find it is no irrigation dam. It is a flood-control dam. Congress never authorized it for that. They don't tell you they made a mistake. I have figured it out. At $9,500-a-piece for fur coats, you could have 596 fur coats for the cost of Shade Hill Dam, and those fur coats would have done the farmers a lot more good than the dam. If the Agriculture Department had been on the ground, they could have kept them from going on. A similar one is Bixby Dam, 60 miles south of there on the Moreau River. Congress authorized Bixby Dam as an irrigation dam at a cost of $1,100,000. They have spent $1,381,000 and they haven't begun to build the dam. In short, all they have done is drill a bunch of holes. And they had to give it up. It was the Agricultural Department that stopped it.

Now, I want to skip over to some information here that is the way I feel in connection with the water situation that has been discussed today. This year a subcommittee of the Interagency Committee put out a pamphlet on diversion area. From the figures given therein I have compiled some data. In the first place it divided the basin into three zones. Zone 1, zone 2, and zone 3. The top one stops at Williston, N. Dak., and includes Wyoming and Montana. The middle one includes most of North Dakota, South Dakota, Nebraska, Kansas,

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and Colorado. The bottom one includes western Iowa, eastern part of Nebraska, part of Missouri, Kansas.

Zone 1, the upper zone, contains about 40 percent of the entire basin; zone 2, about 42.5 percent; and zone 3, 17.5 percent. That is the area. The net effect of this is zone 1 contributes 1.68 inches of rainfall for the Missouri system. Zone 2, 0.97 inches, and zone 3, contributes 5.77, or nearly 6 inches, and zone 3 has only 17.2 percent of the entire basin. Down there is where the agricultural program belongs. Down there is where the dams belong. The Pick Sloan plan is not only backward, it is upside down. We have all of the big dams up here to hold the water and we produce only 1½ inches in the upper zone and 1 inch in the second zone, while they produce 6 inches down there. All in all, of the total amount that runs into the Missouri River, 48 percent is in that lower zone. In this report I give you I show a map of the soil conservations districts throughout the Nation. You will find in there the State of Missouri where the most rainfall goes into the river has the least soil conservation practice, and the least dams. They are the ones that need the most dams and most soil conservation.

Now, I have heard can we hold enough water by soil conservation practices and keep it out of the river? If we have less than 1 inch in this second zone here to hold back if we get full compliance and can encourage soil conservation practices in the second zone, we ought to be able to hold back more than 1 inch and have the river run backward. I am confident we can save 1 inch for the land. A clay soil will take care of 1 or 2 inches of rainfall for every 12 inches of depth. A sandy loam soil would take from 3 to 4 inches. That is a common statement made by many people. Mr. Roland said the same thing. He believes we can actually run the river dry. I will add we can make it run backward. I want also to call your attention to the tables on page 8 in here that show that for a term of 50 years wherein the storms of 6 inches or more were tabulated. There were no storms in North Dakota of that size. There was only 1 storm in South Dakota, 3 in Minnesota, 7 in Nebraska, 12 in Iowa, 13 in Kansas, and 29 in Missouri. If we are after holding water back on the soil, or holding it from inundating people, the place to start is where the runoff in big storms comes, as well as the runoff where normal fall comes. Here I show you Missouri has 29 rain storms of 6 inches or more in 50 years. South Dakota had only one. North Dakota none. There is where the emphasis on this agricultural program lies, down in those lower States. I don't mean to say none should be down here. I mean we should do all we can here.

In Shenandoah, Iowa, the Missouri Basin Interagency Committee meeting, Mr. G. W. Branning gave the figures I show here on page 9. They are very, very interesting. In experiments made there, with careful measurements, continuous corn cropping, showed 38 tons per acre lost soil. In rotation, the average in rotation was 9.6, instead of 38. In bluegrass only three-hundredths. In the same way we show, under continuous corn cropping, the flow that went into the river was 6.5 inches. In rotation it was only 3 inches. There they saved 3 inches on that experiment. Under bluegrass it was four-tenths. They also measured how many years it would take to lose 1 inch of soil. Under continuous corn cropping it would take 3.4 years. Under the average for rotation 13.6 years, and if it were in bluegrass,

4,350 years. You can discount that statement 90 percent if you wish for practical purposes and still have plenty left there to show the value of soil-conservation service. I mention that only to bring out the fact the Agriculture Department has brought out a book on crop changes, in which it shows we are going to lose 1,900,000 acres, or nearly 2,000,000 acres of land in the reservoirs in the entire basin. This is going to be a serious blow to the ranches. In calculation from meager information I have come to the conclusion we will possibly put out of production between 10 and 15 million acres of ranch land. I don't know whether I am right or not. It is worth looking into, and a part of the program which you have before you is to try to offset that. If we do not provide something on those ranch lands it will mean that the farmers here in the Corn Belt will not be able to get steers to feed. That means all of the big packing plants should get interested in the proposition. The Agriculture Department proposes in this program to try to offset that.

I want to thank you. I want to say that I feel complimented in having Members of Congress come here and talk to us and ask us questions. I want to compare that with the method of the Army engineers and reclamation. Have they done it? I don't think they have.

Thank you.

Mr. LOVRE. Thank you, Mr. Quickstad.

(The prepared statement submitted by Mr. Quickstad follows:)

AGRICULTURAL PROGRAM FOR THE MISSOURI RIVER BASIN

SIOUX FALLS, S. DAK., MEETING

WATERTOWN, S. DAK., *October 31, 1951.*

Mr. ROBERT POAGE,
Chairman, House Agriculture Subcommittee,
Washington, D. C.

Honorable COMMITTEE MEMBERS: For your assistance the following brief is submitted as covering the salient features of the proposed agricultural program for the Missouri River Basin as outlined in House Document No. 373 of 1949 by the Department of Agriculture on which comment is desired to be made by me on behalf of the Chamber of Commerce of Watertown, S. Dak., and the Codington County Sportsmen's Association of the same city.

1. On page 7 of House Document 373 it is shown that this program is designed to improve the management and conservation practices on 282,000,000 acres of land owned by the 582,000 farmers and ranchers in the basin, as well as on 72,000,000 acres in public ownership. This acreage totals up to 354,000,000 acres of land. On page 22 of this document is given a total cost in round figures about as follows:

To Federal Government	$3,000,000,000
To States and local governments	500,000,000
To owners or operators	5,000,000,000
Total	8,500,000,000

In round numbers, and without classifying the various kinds of lands, the above cost averages about $24 per acre. The report contemplates spreading this work over 30 years. Hence, the average yearly cost will amount to 80 cents per acre. This may be compared to present county taxes on rural land in our home county of Codington, S. Dak., including personal property and structures on said land, of an average of $1.25 per acre, with a range from a low of $0.40 to an extremely high of $1.75 per acre.

It must be remembered, of course, that this comparison is made for the purpose of ability to pay; that the improvements contemplated are in large part in the nature of an investment that will by all rules of accounting be an added cost of the land, rather than a running expense.

While only the Department of Agriculture has all the data necessary for a thorough evaluation of the large total cost, the above unit cost appears very reasonable.

2. Emphasis is directed to the highly important fact that this program contemplates an eventual coverage of all the productive land of the basin and not certain parts of it. Contrast this with the fact that under the Flood Control Act of 1944 the proposed new irrigation would be equivalent to only 4.9 percent of the present cropland of 1.5 percent of the total land area in the basin (p. 9 of USDA bulletin "Changes in Crop Production anticipated from Proposed Irrigation and Reservoir Development in the Missouri River Basin," February 1950). Contrast this, also, with the only stated protection assured by the Army engineers to agricultural lands anywhere in the basin as being to approximately 1,800,000 acres of land along the Missouri River between Sioux City and the mouth at St. Louis, in the flood plain, and only from floods of past magnitude (pp. 17, 19, and 26 of H. Doc. 475 of 1944). This latter area would be equivalent to 0.51 percent of the total land area of 354,000,000 acres covered by the agricultural program. The contrast of benefits assured to only about 2 percent of the land area under the one program and almost 100 percent under the other fairly shrieks to one's sense of equitable justice.

3. While the spending of deficit dollars cannot be condoned under the burden of a public debt that threatens the stability of the economy of the Nation, at the same time this program seems highly desirable in the long run and should be started immediately. There are numerous reasons for this:

(*a*) Within a span of 32 years this Nation has been engaged in three wars that sadly depleted the natural resources latent in the land, both renewable and nonrenewable. The foremost in importance of these is the fertility and stability of the soil as it affects foods, fibers, and timber. This depletion has long since reached the point where the land cannot further endure the ravages of wind and water in dry or wet years. The plastic, binding humus necessary not only to fertility but also to hold the topsoil from powdering under heat and wind and from puddling and running under heavy downfalls of rain is fast disappearing. In the final run international peace is absolutely necessary to save our soils; but meanwhile conservation practices are urgently needed.

(*b*) After having endured about 11 years of drought this basin and the whole Nation has now completed the enjoyment of 11 years of good rainfall. Evidence is increasing that an eventual cycle of dry years is overdue. All available rainfall records indicate that nature strikes a balance in its rainfall. And when heavy rainfall visits a certain locality some other locality suffers the loss. If all moisture in the air were precipitated evenly over the world at any one time the amount would not be over one inch. The winds take from Peter to give Paul when heavier than normal rainfall occurs in one locality.

(*c*) The Pick-Sloan river development in the Missouri Basin will in some features only aggravate the land conditions, especially for the uplands. When the main channel of the Missouri, or any of the major tributaries, is robbed of its load of silt by settling in reservoirs the stream below the dams will acquire a greater velocity. Nature has made all streams in the world automatic in the adjustment of their regimen to the varying conditions of flow, load, and channel configuration. Under this law of nature these streams will at once start cutting a deeper channel and thereby lower their grade. Under another law of nature all tributaries to such a stream will likewise begin to lower their grade, because no tributary enters its master stream except on the same level. This in turn will cause the trib-tributaries to cut and lower their grade, clear through the creeks, brooks and rills until the top of the highlands is reached. In other words erosion will be speeded up on all the land below dams that entrap the silt load. Specifically in the Missouri Basin we can expect increasing erosion of all the lands below Gavin's Point, from there to St. Louis, and similarly in the case of dams on its tributaries. After the Hoover Dam on the Colorado began to desilt that stream there has been conspicuous in scouring of its bed below that dam. (See p. 80, Physical Geology, by Longwell, Knopf, and Flint, all of Yale College, 1948, John Wiley & Sons.)

There is also a serious question as to what will happen in the same way to tributaries entering a reservoir. In its natural condition a stream finds considerable friction in the boulders, bank configuration and silt load, which holds its velocity down by what is called turbulent flow. Under turbulent flow the velocity of a stream varies as the square root of the slope. When such a stream enters a lake or reservoir, however, it is relieved of considerable friction for many miles back from the master stream, and its flow more nearly approaches what is called laminar flow, that is, straight, smooth flow. This is a flow under

which the velocity varies directly as the slope. In a system of reservoirs several days may be cut in the time of travel of floodwaters from headwaters to outlet (p. 612 of Applied Hydrology, Linsley, Kohler & Paulhus, 1940, McGraw-Hill Book Co.). This would have the net effect of speeding the flow of all tributaries upstream from their point of entry into the reservoirs, with consequent scouring back to the highlands where hoof and plow meet topsoil.

You have heard much ado from the Army engineers about preventing erosion by their plans. Their idea of erosion is a twisted concept from the original purloined by them from the Soil Conservation Service. What they mean is none other than bank cutting along the river channel where muskrats and crayfish have first right by nature to the land, and where these same creatures are the chief enemies of the levees on which these engineers have doted for over two centuries with increasing records of failure. The erosion contemplated by the Department of Agriculture as of prime concern to the stability of the Nation concerns the topsoil in the fields, pastures, meadows, cattle ranges and forests that comes directly under the impact of the plow, the hoof, or the beating of wind or hard rain, in some cases so far away from any stream that for all practical purposes no stream is in sight. Even a short reflection on the question of where the most wheat is raised, or corn, hay and beef, will show where the major emphasis should be placed on erosion control.

A major field in which the agricultural program is urgently needed and long past due under the Pick-Sloan program to prevent it from going hog-wild is in the plans for irrigation. Attention is invited to pages 39, 120, and 144, et seq, of House Document 373, for a full discussion of the many pitfalls attendant upon initiating, planning and successfully continuing irrigation for the first time. This is especially important in the extensive areas in North Dakota, eastern South Dakota and eastern Nebraska, where it is proposed to undertake irrigation on lands ill suited to that kind of agriculture because of the low slope for drainage, the heterogeneous composition of the soil, the rolling surface, the soil profile unsuited to grading for evenness, and the known alkali content of the soils there to be doused with waters highly charged with still more alkali. Two instances may be cited to illustrate the urgency of common-sense advice: The Bixby Dam in northwestern South Dakota was authorized by the Congress in the 1944 Flood Control Act for irrigation purposes at an estimated cost of $1,100,000. This has now been abandoned because of too much alkali in both the water and the soils. However, the Bureau of Reclamation has advised that some $1,381,000 has already been spent at this place, none of which went into any construction of a dam whatsoever. Another example is Shadehill Dam just 60 miles farther north. This was approved by Congress at a cost then estimated of $1,625,000. The Bureau of Reclamation has now advised several times in the newspapers that the dam has been completed at a cost of nearly $5,000,000. But there will be no irrigation as originally contemplated. It has found the alkali of both the soils and the waters there too much for irrigation. Now the dam is called a flood-control structure. The Bureau would be much nearer the truth if it just called it a good ski jump. At the regular tag price the ranchers in that vicinity could have been furnished about 526 fur coats costing $9,500 for this same amount of money spent on Shadehill, and they would have benefited more that way. A third instance should also be added: In the Crosby-Mohall area of the Souris Valley in North Dakota the Congress authorized an irrigation district of about 1,166,000 acres. Dean H. L. Walster of the North Dakota Agriculture College reported to the Missouri Basin Inter-Agency Committee on October 5 and 6, 1950, that surveys made under his direction showed that approximately 500,000 acres in that area were unsuited for irrigation for much the same reasons as above given. All of these illustrations indicate premature spending on insufficient data, such as this agricultural program would nip in the bud.

4. The research phase of the agricultural program should receive the greatest of consideration. Pages 126–151 of House Document 373 cover this proposal. All of it is basic to any useful program. Existing Federal and State research is limited by funds and personnel to properly carry out the present river program even. The agencies have to stretch themselves out too thinly. I have had numerous occasions to ferret out a true picture of river flow from the meager information contained in the gaging station records of the United States Geological Survey. The indication is plain that sufficient time and personnel is not available to publish readily reached information. Three illustrations of inadequate information and consequent useless execution were given in the preceding section. Another one will be given here to show a more delightful picture:

Since the turn of the century geologists have held to the belief that the continental glacier buried several rivers in North and South Dakota. These were

the present Little Missouri in part, the Heart, and the Cannonball in North Dakota and the Grand, Moreau, Cheyenne, Bad, and White in South Dakota. The Missouri as we know it today was not then in existence. These other rivers flowed mostly northeastward by way of the Red River of the North and into the Hudson Bay drainage. Some flowed east to the present James and down south. About 100 miles of these rivers east of the present Missouri were buried on each of these rivers. The present Missouri was then cut by the waters from the melting ice sheet. All the other rivers were then captured by the Missouri and remain as tributaries to it today. East of the Missouri a deep glacial till was piled over their eastern extensions.

On September 13, 1951, the United States Geological Survey released the information that while prospecting the James River Valley in South Dakota for information in connection with the proposed irrigation of that valley it had found the buried Bad River in the counties of Hand, Beadle, and Spink along the James. An overburden of about 40 feet lay over it. In the sands and gravel bottom of this buried river the United States Geological Survey had already found sufficient water to irrigate 50,000 acres. At Huron, S. Dak., it had found enough water in this buried river bottom to furnish Huron's city water supply for 300 years.

Now, if the United States Geological Survey will have sufficient authority, funds, and personnel there is no reason why it should not be able to go on with this finding and locate the seven other buried rivers and explore the entire length of each. There is good reason to believe that the waters to be found therein are less impregnated with alkali and other mineral salts than the Missouri water. It would seem that the further expenditure of money on Oahe for irrigation purposes cannot be justified until the full measure of these buried rivers has been determined.

This is a case of finding diamonds in our own back yard. A map is attached hereto to show the location of these buried rivers according to geological speculation.

5. In view of the prevalent disposition of hydraulic engineers to spurn the efficacy of land conservation practices for retention of surface waters it is felt that this committee should have the benefit of some statistics not readily available. These I have compiled from various sources.

(*a*) The Missouri River and its basin should first be compared with the other major river divisions of the Mississippi system. From information given on page 24 of Floods, Their Hydrology and Control, by H. K. Barrows, 1948, McGraw-Hill Book Co., I have compiled the following results that indicate the Missouri River as a mild offender as contrasted with the popular propaganda of late years:

	Drainage area square mile	Percent of system	Snow and rainfall in inches	Evapotranspiration in inches	River flow in inches
Missouri	529,000	42.2	22.81	21.17	1.64
Upper Mississippi	187,000	15.0	31.82	27.39	4.43
Ohio	204,000	16.4	44.70	25.81	18.89
Arkansas, White	186,000	14.9	29.30	24.71	4.59
Red, Ouachita	90,000	7.2	40.00	32.76	7.24
Lower Mississippi	54,000	4.3	49.87	35.04	14.83
Total	1,250,000	100.00			
Average			31.10	24.81	6.29

In acre-feet of water the above data show the following:

	Rain and snow, acre-feet	River flow, acre-feet	Percent flow of rain
Missouri	643,546,124	46,336,000	7.20
Upper Mississippi	317,251,721	44,164,000	13.92
Ohio	486,335,991	205,616,000	42.27
Arkansas, White, approximate	290,655,990	45,543,220	15.67
Red, Ouachita, approximate	192,000,000	34,766,480	18.11
Lower Mississippi, approximate	143,625,590	42,716,000	29.74
Total	2,073,415,416	419,141,700	
Average			20.22

The net results of these tables to be emphasized are that the Missouri River has the largest basin area, the least precipitation in inches but the most water in total in rain or snowfall, and most significantly the smallest percentage of such fall returned to the sea via the river flow. If there is any merit in discounting the efficacy of conservation practices that would be more applicable to such as the Ohio and the lower Mississippi rather than in the Missouri Basin.

(*b*) Next the Missouri River and its basin should be analyzed in more detail. For that I have taken information given in the report entitled "Adequacy of Flow," April 1951, by a subcommittee of the Missouri Basin Interagency Committee. In this analysis the Missouri Basin is divided into three zones. Zone I embraces mostly the States of Montana and Wyoming. Zone II embraces North Dakota, South Dakota, a part of Colorado, western Kansas, and the western two-thirds of Nebraska. Zone III embraces eastern Nebraska, western Minnesota, western Iowa, and Missouri. Roughly, these three zones are above Williston, N. Dak., between there and Sioux City, and below Sioux City. Another way of stating it is that zones I and II are divided by the line of 15 inches of precipitation, and zones II and III by the line of 25 inches. A map is attached hereto showing this division and further data.

	Area, natural, square miles	Area, natural, acres	Area, percent	Precipitation	
				Acre-feet	Percent
Zone:					
I	211,809	135,615,360	40.03	159,574,069	29.27
II	225,133	144,085,120	42.53	214,806,899	39.40
III	92,318	59,083,520	17.44	170,849,845	31.33
Total	529,350	338,784,000	100.00	545,230,813	100.00

	Runoff in cubic feet per second	Runoff in acre-feet	Runoff in inches	Runoff, percent
Zone:				
I	26,288	19,032,512	1.6840	32.22
II	16,036	11,610,064	.9669	19.66
III	39,260	28,424,240	5.7726	48.12
Total	81,584	59,066,816		100.00
Average			2.0920	

NOTE.—Data here shown is the latest revised and covers about 60 years.

	Precipitation in inches	Evapo-transpiration in inches	River flow in inches
Zone:			
I	14.12	12.44	1.68
II	17.89	16.92	.97
III	34.70	28.93	5.77
Average	19.31	17.22	2.09

Significant in the above are such as—

Area or zone II, the largest, shows the least river flow.

Zone III, the smallest by far, shows the most river flow.

Zone III shows the largest volume of flow as well as inches.

Incidentally, this shows the upside-down feature of the Pick-Sloan Dam system of having about 75 percent of the reservoirs in zones I and II.

(*c*) the above tabulations show—

First, that the Missouri Basin runoff should be the easiest to control in the entire Mississippi system.

Second, that zone III of the Missouri Basin needs the greatest attention in this respect.

Third, that the small runoff of 1.68 inches in zone I and 0.97 in zone II are entirely within the potential prospects of control with land management practices.

(*d*) The above tables cover normal flows, annual flows, and annual rainfalls. If now the annual rainfalls be combed for significant storms we find the following reported by the Miami Conservancy District of Ohio:

Number of storms 6 inches or more—50 years, 1887–1936

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
North Dakota													0
South Dakota							1						1
Minnesota							2		1				3
Nebraska						1		2	3		1		7
Iowa						3	4	1	4				12
Kansas					1	2	1		6	1	2		13
Missouri	3		1	1	2	2	5	3	6	3	2	1	29
Oklahoma				2	2	1	2	3	2	2		2	16
Arkansas	3		3	4	2	1	2	4	4	2	4	3	32
Texas			1	7	7	6	5	4	7	5	4	3	49
Louisiana	4	2	6	4	6	1	5	4	7	3	4	6	52
Mississippi	5	2	7	8	8	2	2	3	6	3	3	8	57

Source: Floods, Their Hydrology and Control, H. K. Barrows, p. 33.

The above emphasizes again the fact that surface runoff cannot be controlled by either dams or land treatment in the Northern States only for any effective relief from floods. It points up the commonly known fact that southern floods must be attacked where the water first falls. This shows the upside-down plan of the Pick-Sloan program most eloquently.

6. In view of the above indications there is attached hereto a copy of an official map of the United States showing the established soil-conservation districts as of January 1, 1950. This indicates considerable room for improvement, but the poignant fact that stands out boldly on this map is that the State of Missouri has made the least progress of all the Missouri Basin States, in fact hardly a token. It should be the foremost.

7. What can an agricultural program of land treatment do to retain water and soil? The progress of this kind of conservation in the United States is hardly more than 15 years old. It has little local background from which to draw conclusions for lack of facts. Its adherents have had faith in its efficacy, and they are legion. Up to now they have not felt compelled to justify their efforts. The work has been carried on in a democratic way without a national plan. Each farmer has made his own evaluation. In this respect this movement has continued somewhat like good forest management, without statistics.

There have been many local instances of good success cited. Dr. E. A. Norton, Assistant Chief of the Soil Conservation Service, stated in August of 1951 at Sioux City that on the whole a full compliance with soil-conservation practices can hold back from 35 to 38 percent of the water, but what is of more importance, the same practices can retain nearly all the silt that fills the streams in floods. This silt is generally considered the most damaging element in a flood.

At the meeting of the Missouri Basin Inter-Agency Committee in Shenandoah, Iowa, on June 21, 1951. Mr. G. M. Browning, associate director of the Iowa Experiment Station gave an address on this subject in which he gave the following significant results determined, near Shenandoah I understand:

	Annual soil loss (tons per acre)	Years to erode 1 inch	Annual runoff (percent)	Annual runoff (inches)
Corn continuous	38.3	3.4	18.7	6.5
Corn oats meadow rotation:				
Corn in above	18.4	7.0	12.6	4.4
Oats in above	10.1	13.0	9.9	3.5
Meadow in above	.2	650.0	3.8	1.3
Average of above	9.6	13.6	8.8	3.1
Bluegrass continuous	.03	4,350.0	1.2	.4

	Erosion per acre
Length of slope:	*Tons*
75 feet	10
150 feet	30
300 feet	96

	Field boundary	Contoured and terraced
Terrace effects:		
Soil loss (tons per acre)	28	0.5
Runoff (inches	4	.5

8. Putting together the facts so far produced it appears entirely feasible for zone III to reduce its runoff and soil loss to the same extent as shown at Shenandoah. Little sympathy needs be given those who claim small experimental plots are not accurate indices of large area possibilities. The Department of Agriculture has consistently depended on such small plot experiments for all the agricultural development of the Nation.

It appears also entirely feasible for zones I and II of the Missouri Basin to accomplish the reduction of from 35 to 38 percent of water flow as given by Dr. E. A. Norton. In fact, with full compliance in these zones and with the small amounts of 1.68 and 0.97 inches of runoff in them there might be some concern felt by the people below Sioux City lest the rivers be run dry. It is commonly known that 1 foot of clay soil can soak up 1 to 2 inches of rain, and a sandy soil from 3 to 4 inches.

9. There will be about 1,900,000 acres of river bottom lands inundated by the Pick-Sloan reservoirs, permanently, according to the bulletin by the USDA entitled "Changes in Crop Production," mentioned earlier in this brief. That bulletin did not explore the effects on the livestock industry from this inundation. These bottom lands have heretofore furnished the heart of the range. Here the cattle and other livestock has found shelter, nursing, hospitalization, and feed during late fall, through the winter and in early spring. I have been advised that each block of 30 acres of upland needs 1 acre of such bottom land for a successful range. From this it appears that from 10,000,000 to 15,000,000 acres of upland will be useless to the livestock industry for lack of such "heart of the range." The Department of Agriculture under the proposed program will have a heavy burden to discharge in connection with this problem.

10. Finally it is desired herein to emphasize the fact that this proposed agricultural program is at least two-fold in that the practices are intended to assure stability in both wet and dry years. Of these two the dry years are more important. Then, again, this program will enchance the future prospects of production at a reasonable cost. This cost each farmer or rancher will personally scrutinize very carefully. There is no program within the reach of mankind that will eliminate the hazards of weather for at least 98 percent of the Missouri Basin. Dry farming must be encouraged. Irrigation must not go so berserk as to disproportionately emphasize the raising of potatoes and sugar beets to the extent that further Federal subsidies will be necessary to keep the irrigators on the land. The attention of this committee is urged to page 27 of the USDA bulletin "Changes in Crop Production," on which page the Department of Agriculture shows deep concern about this matter. It will be remem-

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bered that the Department of Agriculture is in rather a unique position of having to justify its own continuation by keeping farm and range people in sound financial condition. For that reason it should be given the authority and funds to so function in its proper sphere.

Respectfully submitted.

C. O. QUICKSTAD.

Mr. LOVRE. The next witness is Ralph T. Dennis, of Canova.

STATEMENT OF RALPH T. DENNIS

Mr. DENNIS. Mr. Chairman and members of the committee, my name is Ralph T. Dennis of Canova, S. Dak. I operate a 480-acre farm in Hanson County and have been active in the Government farm programs. I served as county chairman on the AAA for 6 years, helped organize the Hanson County Soil Conservation District, am serving as a member of our board of supervisors, helped organize our REA and am serving as director on that board. Also I am a member of our State soil conservation district board. I am appearing as a private individual offering my own ideas and not representing any group or organization.

It is a pleasure to have the privilege to appear before you and to discuss the problem of soil conservation and flood control. It is also a pleasure to have one of our own South Dakota boys on your committee: our own Harold O. Lovre. Mr. Lovre, or Harold as we know him out here, has made good his campaign promise to try to do something about agriculture. When he came out to my farm asking my support as one of the delegates to our State Republican convention in Pierre, I put him through the third degree as to where he stood on a farm program, and his stand on soil-conservation districts. He passed that examination by his knowledge of farm problems. One of his opponents said, "Yes, I am for soil conservation; we must do something to save our wild ducks and geese."

That, gentlemen, is typical of many of the people who talk soil conservation. I am a farmer, doing my own farming and think and talk of the top 6 inches of soil that keeps us from getting hungry and puts clothes on our backs; also many other things that we use in our everyday busy life. I am thinking about wind erosion and water erosion depleting and washing our top soil away. With water erosion comes flood control.

If we can control our water erosion and keep a good cover of grasses and legumes on our hilly land we have gone a long way toward controlling wind erosion. In controlling water erosion we must start at the bottom of the problem or our efforts are in vain. When I looked up at the mighty Mississippi River at Baton Rouge, La., at flood stage, I felt the need of keeping our river waters under control. I don't wonder that the people down there want the northern States to do something about the floodwaters.

While visiting some water controls in Montana this fall, as I was attending a regional soil conservation district meeting, I came to the conclusion that the soil conservation district was the basic start to flood control of floodwaters. Out there I witnessed the spreading of floodwater or thawing of snow water from the mountain slopes by use of diversion dams or spreader dams, the water soaked into the ground last spring, and now a good cover of grass is established which

is several inches high. This took place in the area receiving 12 inches of rainfall per year.

This same procedure holds true wherever rain falls. Most years the Northwest and North Central States do not receive over amounts of rainfall. We need to use methods of conserving our moisture to grow our crops. In my way of thinking we need more technical assistance and educational help to get our people to follow these practices. If the Congress would only see fit to give the farmer full parity for his crop and livestock, we would not need benefit payments or handouts to get soil conservation on the land. South Dakota's Harold O. Lovre has offered you his farm plan to give the farmer his share of the economic dollar. Now we need your support to get it into operation. This done, we would be free to carry on our soil conservation districts.

If our farmers could have their finance under control, they would be willing to carry on soil conservation without further payments. He would need technical assistance to lay out his farm to get the most out of each acre according to its capabilities. Most farmers realize we cannot go on forever without doing something to replenish our soil fertility and keep it in place by not washing or blowing. If we are going to carry on a program costing millions to just earn votes then we are playing a losing game, and we might just as well forget the future generations and live for today only.

I think the town and city people realize the danger to our land and would be willing to help save our soil. Last fall I talked to several hundred over our State and found them in favor of our soil conservation district movement. They did not favor payments as set up under PMA to give the farmer 65 to 75 percent of parity on his crop and livestock and a tin cup to go to Washington for the balance. This practice leads to strong Government controls and another branch of socialism and then to communism.

I feel we need flood control on our rivers. The only way to do that is by the use of dams to hold back spring flow. We also need generation of electricity to care for our people in this basin. Ele tricity has changed the life of our farmers and ranchers to a great degree, permitting them to have the conveniences of a modern home. Also aiding them with electric energy when farm labor is short.

I am strong for our soil conservation districts because it gives the farmer control of his own problems, with technical assistance of the Soil Conservation Service. The Soil Conservation Service is the place to give the appropriation if you want soil conservation on the land. The Soil Conservation Service is short of funds to hire the necessary personnel to properly help the district plan its work.

If we build huge dams on our rivers and do not hold the erosion of our land back by soil conservation practices, we will soon silt up our dams and defeat the whole program.

I am not in favor of throwing all farm programs—soil conservation districts, REA—under one branch of MVA as is being done under TVA. I don't think it is any place to retire any group of broken-down Congressmen, give them a good salary and an appropriation from Congress each year as the attendant said they do at Norris Dam. Just turn in the expenses together with the money received from electricity and fertility and get a new appropriation for the next year. I would rather keep it under the present control.

Mr. LOVRE. The last witness we have is none other than our old friend, Henry Mundt.

STATEMENT OF HENRY MUNDT

Mr. MUNDT. Mr. Chairman, members of the committee, this meeting reminds me of a meeting where one speaker had made a long speech and when he finished found there was only one man in his audience, and when he stepped down he thanked that man very much for listening. The man said, "Mister, I am the next speaker."

I have been listening here today to this meeting and was very much interested in what has been said. I have lived in this State all my life. My father was one of the old pioneers in this county. I have practiced law here in this city for the last 32 years. I have taken a great interest in this Missouri River development proposition. I agree with practically everything that has been said here today about what is necessary and what is needed and what your problems are.

The thing I am principally interested in is in the method of development and in the method of administration. It is obvious to me here today that it is quite a problem, with all of the testimony that you have heard, to digest all of that matter and put it to effective use.

I studied the Pick-Sloan plan and its history and I discovered where they disagree between themselves as to what ought to be done. They have condemned each other's projects. Then I heard of the Tennessee Valley Authority. I read the book by Mr. Lilienthal. In trying to ascertain now what ought to be done in the Missouri Valley, I made a trip down there to see how that system operates, and how it works; its accomplishments; and to ascertain how people in the Tennessee Valley feel about that particular enterprise. I had the privilege of going through that valley from one end to the other and interviewing businessmen, chambers of commerce, laboring people, and editors of newspapers. Almost without exception they were eminently satisfied with the way it was handled and in the success it has attained. I found that, as a general proposition, the people in that valley were well satisfied with what had been done. I remember very well an incident in a barber shop in Mussel Shoals. I asked him how they felt about the Tennessee Valley Authority, and they said it was a godsend to that community. The sheriff broke in and I asked him if there were any objections to it, if there were any people in that Tennessee Valley who were dissatisfied, and if he could give me some idea of what it represented. He said there are only a few thousand he thought were dissatisfied. I said, "Can I go back to South Dakota and quote you?" He said, "If you are going to quote me, make it 1,000."

Now, that is the problem here in the Missouri Valley. As I see it, it is this: What is the proper thing to do here? What should be done here in the Missouri River Basin? What is the best over-all integrated thing which should be done here? What is the best thing that should be accomplished here?

There is the problem of conservation; problem of agriculture; problem of resources development; problem of flood control. There is also the issue of navigation. It seems to me that in order to have a clear picture, a clear understanding of what is needed here, or what

should be done, I think we should have an authority system like that of the TVA. I like the system they have there for this reason. There is a Board of Directors and a Manager. The Board of Directors is appointed by the President with the consent of the Senate, and under the law they are charged definitely with certain responsibility. I think here in this valley we should have that authority for the reason that we ought to be able to frame a law and outline what should be done here, and what they should accomplish. Within the framework of this law there ought to be a definite policy set forth as to what they expect or what they should do. In the authority system there is also contemplated this provision, that there should be a commission appointed of competent men to make a complete survey of the entire valley, of the entire situation, to ascertain what is the best thing to do for the entire valley and all its members. And it ought to be a nonpartisan proposition. Politics ought to be eliminated from it. I think any group of people who are primarily interested in promoting this thing for their own benefit ought to be eliminated from it. We ought to get scientific accurate knowledge of what is required and what ought to be done, and this commission, under the authority system, provides that they should report to Congress on their findings and the facts should be presented. The cost of the proposition can be presented, and in that way I think we are going to get a better and more accurate way of ascertaining what ought to be done. I think we can do it in a more efficient and more effective manner and at less cost to the people of the United States.

Now, I realize that there is a lot of opposition to an authority. I have heard most of those arguments, and as for me, those arguments will not hold water. I realize that if we have an authority system like they have in the Tennessee Valley, it is going to raise some objections from certain interests and groups in this country. When I was in the Tennessee Valley I talked to the directors and I found they were not advocates for their particular system. I found out in the Tennessee Valley they are not a supergovernment; that they cooperate with all of the State agencies and county agencies that exist. They cooperate with every county agent. They cooperate with every agricultural college. They are not the dominant factor in that particular area. They are furnishing services that they have. Just to illustrate, I talked to the editor of a daily paper and he said he originally had opposed the authority. He thought they were a kind of supergovernment, that they were dictators. He said, "We have found out that is not true. Their representatives came down here and told us what services they had; what they could furnish. Either we could take it or leave it. We found out they were the best friends in the United States. Whenever we asked for any information they gave it to us, and we have found out that that information was right. And in this valley these people are charged with responsibility to do what is the best thing to do." And in this valley I think we are going to get a lot more benefit than we will get by the present system that we are pursuing. I think that the present system is not going to get us the results that we should have. I think that an authority system that is located in the valley where the development and administration is to take place is a lot more efficient than it is to have it administered out of the various bureaus at Washington, D. C. It is going to be

closer to the people. Governor Anderson said he didn't believe in the authority system because it would import people from other sections of the United States. That can be taken care of by the Congress. That can be taken care of and overcome if that is an objection to that system. I told Harold when he went to Congress, "The first thing you ought to do is go down there to the Tennessee Valley and see how they operate and what they do—to see whether or not that is a proper system to have in the Missouri Basin development here." I don't know whether he went down there or not, but I am satisfied that if all of you who were here today would go down in the Tennessee Valley and examine what they have accomplished and how they function and how they administer things in that section of the United States, I believe you would be enthused for that system. When I asked those people, "Why wouldn't it work here in the Missouri River Basin?" they said, "We don't know. You can see how we operate here. You may have a different set-up than we have here."

Now, I am told there is a question of irrigation. There is a question of keeping the water on the soil; to hold back the water of the tributaries before it goes into the main stream. And this will entail the development of some dams, and when we build dams we ought to use the power development of those dams, wherever they are. And that is the thing which I think is the very thing that raises the biggest opposition. I have had some experience in the legislature in South Dakota when I tried to protect the municipal light plants in the State of South Dakota. When I introduced a law and revenue bond measure for cities to establish light plants in the city and pay for it out of revenue of that plant, immediately all of the power representatives in the State of South Dakota and elsewhere were there to defeat those bills. And the biggest opposition we have to the authority system is the power interests of the United States. Why? Because of the big power development that took place in the Tennessee Valley. They don't want any more of that angle in the United States if they can prevent it. It is not a question of selfish interest of any particular group. The vital thing is, What is best for the entire area here in the Missouri Valley; the best interest of all of the people? We are not interested in whether or not it is going to curtail this particular group or that particular group. The main proposition is what is for the best interest of the entire valley regardless of who it may affect. Of course, some parts of this valley may have to yield to other parts of the valley in the best interest of the entire valley, and so that is a big job. I don't see how you can possibly accomplish this thing without having a set of men, capable men, experts, who can go in there and ascertain what is for the best interest of this valley. That is what we ought to do. I know if you went down to the Tennessee Valley and you thought it was good and made a statement it was good and you were for it, the power interests would do everything they could to defeat you in the next election. I know from experience what they would do to any candidate who would be in favor of that program that they thought would interfere with their own business.

As far as I am concerned, I think there should be consideration given to conservation, irrigation, and power development, as against navigation. I think, as far as navigation is concerned, I think it is infinitesimal compared to other benefits we might have in the Missouri River development.

So, then, it is my considered judgment that the best service that the congressional committee can do for the Missouri River Basin is to come out for the authority system patterned after the TVA, amplified perhaps to meet other conditions that exist here in this valley. When you have done that I think you have made the greatest contribution. This Tennessee Valley system was established by Senator Norris of Nebraska. He challenged the entire power interests of these United States. He finally convinced the Congress of the United States that that was the thing to do in that section of the United States. It was a monumental achievement and has transformed that section of the United States into a fertile, productive country. Here in South Dakota there are a lot of resources that need to be developed and that could be developed. The only way you can develop them properly is to have the assistance of cheap power. In the Tennessee Valley, the reason they have a lot of new industries there is because of cheap power. A lot of manufacturing concerns are locating there because of very cheap power. We can do the same thing here in the Missouri River Basin.

Now, you can have all of these hearings you can conduct. You go back to Washington. Whether or not you are going to be able to digest this and make use of it, I don't know. You are busy with war and other problems in Washington. I don't see how you Congressmen and Senators can possibly give sufficient time to this angle for the Missouri River Basin. I think this is going to be a job for experts to first ascertain what ought to be done and what should be done and what it is going to cost. When we do that, we are going to be in a better position to determine what should be done. It is not going to interfere, as I see it, with the development that has taken place so far. If we have made some mistakes, let's not continue making more mistakes. If we ascertain that the present program that has been operated, or the Pick-Sloan plan, is not feasible for the Missouri River Basin, we ought to abandon it. I have here a lot of figures about this deal. First it was calling for a few million dollars. Now it is up to $9 billion, and I have read where this program will cost $23 billion. It is a gigantic problem. It is going to cost a lot of money. We ought to have the most efficient system, the most economical system that can be obtained. We ought not to disregard that because the power interests are starting a lot of misinformation about it. That is one reason we have such opposition to the authority system. I saw one of the reports of a private power company to their stockholders.

Here is the significant thing they said in there: That they were not opposed to the Pick-Sloan plan because the Army engineers were more interested in flood control than they were in power development. That in the authority system they were laying emphasis on power development. They know what the authority system has done in the Tennessee Valley and they can visualize what might happen here. In the Tennessee Valley the Alabama Power Co. was in there and they have made money out of that. There is room for both public power and private power. There is a lot of territory in these United States where private power companies can legitimately operate. There is a place for public power and that public power ought to be in the hands of the people of the United States and ought to be utilized at wholesale rates to the people and to industry and to all of the people in this Missouri Valley.

In conclusion, my considered judgment is that if I were in the Congress of the United States, I would be for an authority system. I would endeavor to frame a law that would meet the requirements and operate on that basis, because I believe under that system we will get far better results. It will be administered in a more efficient and effective manner and at less cost to the people of the United States.

Mr. LOVRE. Thank you very kindly, Mr. Mundt. I want to say to you that these hearings will be reduced to writing and it will be a matter of public record and all of the Members of Congress and everyone else will have the benefit of your testimony and all of the other testimony given at this hearing today.

I am exceedingly sorry, but for some unknown reason the name of Paul Beck, of Sioux City, was not given to me. He wants to state his position here. Mr. Beck.

STATEMENT OF PAUL BECK, REPRESENTING IOWA IZAAK WALTON LEAGUE

Mr. BECK. I am here representing the Iowa division of the Izaak Walton League of America. I am vice president of the Iowa division, and we want to file a record in this hearing, which is unalterably opposed to a valley authority as being socialistic in concept, and also to the fact that the Presidential appointments we feel are too hazardous a method of handling a territory as large as comprised in the Missouri Valley. We have a suggestion or plan that we would like to propose. It is carried in a resolution adopted at the annual meeting of the Iowa division of the Izaak Walton League of America.

The gist of it is this: Urge the passage of State and Federal legislation creating a Missouri Basin Watershed Board to consist of one civilian representative from each of the 10 States in the Missouri Basin, and one representative from each of the following Federal bureaus: The United States Department of Agriculture; the United States Fish and Wildlife Service; the United States Corps of Army Engineers, and the United States Bureau of Reclamation, each civilian representative to be nominated by and elected by a majority of the presidents of all of the soil-conservation districts in each State.

Our purpose in framing this resolution is to bring back to the people of the basin the control and management of the affairs of the basin. We don't want anything of a dictatorial nature set up. We don't want anything that will have to function according to the whims and wishes of any political group or President, regardless of the qualifications of an MVA just expounded to you. Their present directors may be perfect. Their system may be perfect, but we are absolutely opposed to that because there is a big hazard in that the next board of directors may not be perfect. We are also opposed to the Pick-Sloan plan as it is presently being operated, for the reason that as shown by the testimony given today the main point stressed by every witness was the fact that this watershed control is going to start at the top part of the watershed and then be integrated throughout the basin and then, and only then, after that control has been instituted, should there be any consideration of main stream improvements on the Missouri River, or any other river. I feel that the handling of the Pick-Sloan plan is wasteful and extravagant by the very nature of it, and that

the entire program can easily result in greater damage to the basin than good can come from it.

I want to thank you for this opportunity to appear before you. I will turn this information over to the reporter.

Mr. LOVRE. Thank you, Mr. Beck.

Are there any other witnesses present? If not, I will ask Mr. Hope to close the meeting.

Mr. HOPE. Mr. Chairman, I am very grateful for the opportunity to have been here today and to have heard the fine presentation of the problems of this area in connection with the Missouri Valley program. This is the fourth meeting of this kind the committee has had in the last 3 weeks and the interest that has been shown in each of these meetings has been splendid and I am certain the meeting today has been one of the best we have had in this entire series.

I am a great believer in on-the-spot investigations on the part of congressional committees. I don't think there is any other way we can acquire information that will help us in passing legislation or in overseeing administration of existing legislation which we are charged by law with doing, that is equal to on-the-spot investigations. I am sure the committee is going to get a tremendous amount of information and benefit out of the record of these hearings. I had hoped that more members of the committee would be able to be present today. I am sure that all of them would have benefited had they been present, but the record will be available to all of them. They can read all or part of it and look up the particular matters in which they are interested. What has been said at this meeting today will go far beyond the confines of this room and will furnish information to far more people than have been able to attend this meeting and the other meetings of this series. I feel sure that we have accomplished a great deal today in laying the foundation for further extension of the Missouri Valley program.

I could talk for a long time on this matter, but I am simply going to thank you for the fine presentations made today. There hasn't been a speaker who havn't contributed something of value to this meeting.

In conclusion I want to say I am very happy to be here in the home district of Harold Lovre who is such a valuable member of the Committee on Agriculture. He came to Washington, not as a notice who didn't understand anything about the agriculture problem, but he had studied it before coming there. He knew a great deal about it. He didn't have to learn it all after he came down. Since he has been in Washington he has earned the respect of his colleagues who have worked with him and I know of no man in Congress who has been there an equal length of time who stands higher in the esteem of his colleagues. I was especially happy when he came to the Agriculture Committee. He has contributed in a most effective way to the work of that committee. I am very happy to be here in his district and meet with his friends and constituents. I am going to take back with me a picture of the situation I could have acquired in no other way. Thank you.

(The following statements were submitted for inclusion in the record of the hearings:)

STATEMENT OF DALE E. TUPPER, GARDEN CITY, S. DAK.

Agriculture is the only scource of income in my State, or at least in the county in which I live; that is in Clark County, State of South Dakota and it is therefore very important to the people in this State, not only to the farmer, but to the businessman as well, that everything possible is done to promote agriculture. In the past 10 years, many of the farmers in my county have come to enjoy some of the comforts which have long been taken for granted by our city friends, and while there are many contributing factors leading to this better way of life, it is my sincere opinion that no other single thing has made so great a contribution to our welfare as has the soil conservation program.

The word "conservation" means to preserve from injury; to preserve from destruction; to preserve from waste. With reference to the natural resources, i. e., soil conservation, water conservation, mineral conservation etc., the greatest of of all is human conservation. Now then, if soil conservation has been such a great contributing factor to a better way of life, thus establishing human conservation, then soil conservation is not only a desirable and practical program, but it is an essential and vital program as well.

Having made these rather bold statements, I will try to point out some of the things which will justify my convictions. My own personal experience gives me quite a lot of justification for my thinking on this matter. We bought our farm, consisting of 320 acres, in the fall of 1945 and as soon as I could I tried to do some fall plowing. For the most part my plow would not even go into the ground, so lacking was the soil in humus and organic matter, and when the plow did go into the ground, it would not scour. In that first year of 1946, in spite of the fact that we had a better than average rainfall and otherwise very favorable crop conditions, we harvested a below-average crop from our land. An investigation showed me that tenants on this place had had like experiences for many previous years and could not make a living on the half section.

Our soil conservation district had not yet been organized, but from reading as extensively as I could, I felt certain that what the soil needed was a good grass rotation and residue management program and this practice is what I started in the spring of 1947. During the summer of 1948, shortly after the soil conservation district was organized, I was invited to go on a tour of the Lawrence Elsinger farm near Dell Rapids, S. Dak. This tour was indeed an eye-opener to me, but I was secretly proud that I had at least started on the right road by the grass rotation afore-mentioned. I realized, however, that this was not enough and that contour farming was a definite "must" on our farm. The reason I say that especially is because on the 320 acres of land, in 1946, there were 26 pot holes and sloughs which really amounted to waste land. They hadn't been farmed for years and while I did manage to seed a few of them in that first spring, the crop was drowned out because the soil lacked humus and would not hold water. I know for a fact that there were 26 low places because we planted potatoes on 60 acres and while it is hard to believe, nevertheless it is true that in that 60 acres we were able to make but one round (four rows) without getting into a slough. For cultivating or digging potatoes, pot holes are a real headache and we certainly had our share of headaches that first year.

So then in the fall of 1948 after making the tour of the Elsinger farm, I asked the soil conservationist to stake contour lines. Since then little by little we have improved the land and through the contour lines have held the raindrops on the hills and hillsides until now we can say with honesty and pride that we have plowed, seeded, and harvested every pot hole and slough except three. Our crop yields have been greater too and while I know that the better than average rainfalls through the past few years have a lot of bearing on this, I maintain that the better than average rainfall in 1946 gave us no extra benefits since we could not use the moisture but had to let it go to waste in the 26 pot holes. The crops which we have harvested from these low lands together with the greater yields since we started soil conservation practices, have enabled us to set up a better standard of living for ourselves and our family.

This is my own personal experience, but I know that it is equally true of any of the farmers in my community who have started these new farming methods. Our improved economic status has given us a new dignity and a greater happiness than any of us have heretofore enjoyed.

The soil conservation district in my county was formed in 1948 and is one of the newer districts in the State. In 3 years' time we have over 250 farmers cooperating, but only about 10 percent of these people have their farms staked out on the contour. It is my sincere belief that all these farms will be on the contour just as soon as possible, but there are so many phases of soil conservation which includes everything from stock water dugouts and dams to shelter-belt planting and our conservationist is constantly kept on the run trying to keep up with his commitments. However, the majority of the 250 cooperators are practicing a long time grass-legume rotation and crop-residue-management program in order to increase the water holding capacity of the soil.

The best possible way of getting across to the average farmer the principles of conserving our natural resources is, in my opinion, through the medium of the local board of supervisors. Each member of the board must be a cooperator and an enthusiastic one at that, to be on the board in the first place and because of their enthusiasm and personal experience they can impress another farmer better than if he got his information from outside sources. Education in conservation practices can best be put across through local tours which show and prove conclusively what an individual farmer can do for his land to hold the water where the raindrop falls. I know this is true from my own experience in the knowledge I gained on my first tour of the Elsinger farm back in 1948. I know a man by the name of Jacob Lederman who lives 6 miles northwest of Crocker, S. Dak., who requested assistance from the district conservationist in laying out a quarter section on the contour. He said he had gotten his idea from another farmer who lives east of Garden City, S. Dak. This is a spread of practice of approximately a 20-mile radius.

It has been my observation that we have a definite watershed problem in the west one-third of Clark County and in my opinion it will require a lot of technical assistance and possibly even Federal appropriation to control. This area of about 13 townships gradually slopes toward the James River and some of the creeks flow from 25 to 100 miles through flat lands before reaching the river. The creeks begin at a relatively high elevation and gradually lose their gradient as they approach the flatlands of the James River Valley. As they lose their gradient they often leave their channels and cut over cropland and sometimes during flash rains, bridges have been washed out on the highways. A common bridge on a county road costs around $3,000 and I do feel that such a sum plus the added economic loss of cropland erosion, would go a long way in controlling this problem if some technical service could be practiced.

The statement I made at the beginning of this testimony was that in my opinion the soil conservation program is one of the greatest contributing factors to a better way of life and I submit for your consideration this report which I sincerely trust will justify my statement.

STATEMENT OF LOREN J. BRINDLEY, CHAIRMAN OF AGRICULTURE COMMITTEE, HURON, S. DAK., CHAMBER OF COMMERCE

Representative Poage and members of the House Agricultural Subcommittee: My name is Loren J. Brindley. My home is Huron, S. Dak. I am chairman of the agriculture committee of the Huron Chamber of Commerce. Our organization has been very active throughout the years in working for improved farm and range conditions and for conserving the moisture and soil in our area.

During the 1930's when a greater part of the agriculture area of America was stricken with drought, dust storms, grasshoppers, and other catastrophies, local government and the Federal Government spent millions of dollars, not to improve the conditions but simply to keep man and beast alive. The people I represent do not want to see this happen again. We believe that the same amount of money that was spent for relief could and should be spent to eliminate some of the conditions which brought about the disaster of the 1930's. In this statement it is not my intention to examine in detail every proposal of the Agriculture Department for their part in the Missouri River Basin development program. All I want to do is express some general policies that my organization feels should be followed.

We believe that a sound program for the development of our agriculture and forest lands is essential. We believe that everything possible should be done to conserve our moisture where it falls. We do not want an authority or an all-powerful bureaucracy to lay down an impractical program and tell our

people "This is it." We want a program similar to that provided by the Soil Conservation Service wherein they furnish technical help and advice and the land owners and operators work out their own program of conservation of soil and water practices that meet their particular local problem.

In our Missouri River Basin plan studies were first begun by the Bureau of Reclamation and the Corps of Army Engineers. Only lately has the Agriculture Department presented a program to be coordinated with the provisions of the Pick-Sloan plan. In the development of other valleys we know it would be better to have all these agencies prepare their studies and findings at the same time and to present to Congress a coordinated program. Because pioneer work was done in the Missouri Basin it may appear to some that there is more discord than actually exists. We are sure that the Bureau of Reclamation and the Corps of Engineers welcome all the assistance possible from the Department of Agriculture. We of the basin want to see the plans of the Agriculture Department coordinated as soon as possible. We express this hope for complete coordination of effort without making a blanket endorsement of the original agriculture plan proposed for the valley. We know that in the processes of coordinating the work, if done through the Inter-Agency Committee and the Missouri Valley States Committee, that only the best and the most practical proposals will be incorporated in the over-all plan.

We realize, and I am sure that the Department of Agriculture will not contend that a thorough treatment of the upper region of the valley will eliminate all floods. It will retain a lot of the moisture on the land that now runs away and adds to the downstream floods. Proper treatment of our soils, grasses, and forest lands will increase the productivity of the upper regions and will take the peak (the disastrous part) off our annual and sometimes semiannual floods. This agricultural proposal should not in any way be construed as a substitute for flood-control dams, or for irrigation where projects are practical.

We commend the Agricultural Committee of the House of Representatives for coming to the basin to hold this series of hearings. We appreciate this opportunity to state our views and the opportunity probably would not be taken were it necessary for us to travel to Washington. We know it will be beneficial for you of the subcommittee to visit our territory and to see for yourselves the conditions that prevail. More of our people will present their views to you because of your visit to this area.

We know that in a basin this size some Federal aid and advice is essential in order that a uniform pattern of conservation and development may be followed. We do not want, and we do not think it is necessary for an all-powerful authority or bureaucracy to try to remake the whole Missouri River Basin. We believe that assistance can best be made through the Department of Agriculture working through locally administered soil conservation districts. Our experience with these subdivisions of Government has been very pleasant and beneficial and I believe as inexpensive to the general taxpayers as any agricultural plan ever developed. Through the soil-conservation districts the Federal Government furnishes technical advice and the landowner himself carries the burden of putting the recommendations into practice. In the Huron area we have come a long way since the origination of soil conservation districts and we certainly endorse that method of encouraging and assisting soil and water conservation. Local participation in planning and development work will help insure maintenance of structures built and will give the landowner a sense of responsibility for continuing the practices inaugurated.

We of the upper regions of the Missouri Valley are anxious to keep the water on the land where it falls. Education of the landowners through our agricultural colleges and particularly through the extension service is essential to inform our people of the benefits that accrue to them through a soil-conservation program. We commend the colleges and the extension service for their work along these lines. We think there should be more of it. We believe that the public information from some agencies is more propaganda than informative. No such charges can be made against the Soil Conservation Service or the Extension Service people in this State. Their information has been accurate and their plans practical. Many of our landowners and operators take advantage of the information and advice offered. We hope that the same service and the same acceptance prevails throughout the whole upper basin. Unless our people are convinced that the programs are practical, the cost reasonable, and the benefits lasting their cooperation will not be obtained. This problem is so big and involves the welfare of the entire Nation so that any program authorized by Congress must have the above qualities if the greatest results are to be obtained.

STATEMENT MADE BY F. M. ROBERTS, PIERPONT, S. DAK.

I have been farming on my own for the past 45 years. During the last three I have been a member of the Day County PMA Committee. For 12 years prior to that I managed a cooperative grain elevator. Today I represent no organized group. Naturally I come in contact with many producers and so far as possible I want to bring to you a cross section of their thinking. I am assuming that your committee is interested primarily in ascertaining what benefits, both locally and nationally, are derived from the various departments and agencies sponsored and financed by the Federal Government. The present cooperators and patrons comprise a group that is actually interested in bettering their own and the Nation's welfare. Would-be chiselers have long since changed their ideas and tactics, have dropped out voluntarily, or have been stricken from our list.

COMMODITY CREDIT CORPORATION

The services of CCC probably come nearer receiving 100 percent praise and patronage than any other single agency. In 1950 we had 7 different hail storms but still made 776 loans. To date in 1951 we have made 1,102, probably 300 more were too high in moisture to qualify. It is surprising to note that, while the local price on flaxseed is more than a dollar above the Government's $2.65, farmers are loaning on their crop. They have not been slow in voicing their dissatisfaction with the 60 percent parity price on flax. What happened in 1950 is fresh in their minds. With no adequate local space available they were forced to sell their flax crop for whatever price was offered. Thousands of bushels went to truckers. The cash price for the 1950 crop varied from an average of $2.96 per bushel during October 1950 to an average of $4.48 during February, March, and April of 1951. They also doubt very much if the ultimate consumer was benefited to any marked extent.

With all storage space limited, the average farmer has come to realize that, to be sure of being able to avail himself of any support price, he must provide his own storage space. Besides the many new structures erected independently the PMA has made 29 facility loans.

EROSION

The prevention of erosion and the saving of our topsoil, strongly advocated by the PMA and SCS offices, is receiving more and more attention. Sixty to seventy years ago this northeastern South Dakota was all sod. It has now reached the stage where erosion is a problem we must face and solve. With the incentive payment by PMA and technical assistance from SCS many farms have been cleared of small ponds and "nuisance pot holes," the water drained into larger sloughs, the weeds eradicated, and the land put into production. Dams are being constructed. According to the 1951 worksheets, 262 farmers were considering ditch work and 63 had dam building in mind. To the critics who claim that this drainage is detrimental to wildlife we would answer that the areas drained are not too large, the dams replace them and there is abundant cover left.

Contour farming is being investigated and put in practice. In some cases terrace work has been done. Sod waterways have been planted. Two hundred acres of trees were planted in 1951.

LEGUMES AND GRASSES

Eighty-eight percent of our farmers have an alfalfa acreage. Many seed and plow under sweetclover, both a great help to maintaining fertility. With the exception of summer fallow and residue, 1951 requests for PMA assistance in planting alfalfa definitely outnumber those for other practices, 730 requests for 13,250 acres from 1,494 signers.

FERTILIZER

The application of fertilizer has been mounting tremendously but credit for giving this practice its initial boost must go to the Government's recommendation for its use and the offer to share the expense. In our locality readily available plant food in the soil helps offset the fact that our average rainfall must come at exactly the right time to be adequate.

INSURANCE

In 1949 Day County had the largest number of Federal crop insurance policies in force of any county in the United States. Some have canceled out, some have been added. The main argument against it has been that it does not go far enough. Whenever the insured suffers a loss on his flax and wheat, it will be a rare case when he does not also lose on other small grains and corn. We have been offered multiple insurance. We are calling a meeting of the policyholders and will be very much surprised if they fail to endorse it. This will answer the lack in the present policy. It will also tend to encourage diversification, although we are generally diversified now.

For our own satisfaction we have kept track of the office calls during October. We have a daily average of 46.

Concerning Federal Housing Administration, our observation is that it has been a distinct help in providing enough additional capital for the ambitious young man who wants to make a start in farming.

We speak of industry, labor, and agriculture. I sometimes wonder if the last-named isn't a curious mixture of the first two. Any way you look at it, the welfare and destinies of all three are intertwined, probably more closely than we realize.

STATEMENT OF EVERETT T. WINTER, VICE PRESIDENT, MISSISSIPPI VALLEY ASSOCIATION

My name is Everett T. Winter. My home is in Omaha, Nebr., and I am vice president of the Mississippi Valley Association.

The Mississippi Valley Association is an organization of industrial, commercial, agricultural, and consumer interests with a record of constructive leadership since 1919.

The territory in which its interests are centered lies between the Appalachian and the Rocky Mountains, the Canadian border and the Gulf of Mexico.

The association was incorporated in the State of Louisiana in 1919 as a nonprofit corporation. It has a voluntary membership in 23 States. All or a part of this area drains into the Mississippi River and the Gulf of Mexico.

With the cooperation of land-grant colleges, soil-conservation services, agricultural extension services, State soil-conservation committees, and other State and Federal agencies, the association has financed and actively participated in sponsoring short courses in many of the Midwestern States for the purpose of training rural leaders in the field of soil and water conservation. These meetings have had a State-wide attendance of soil conservation district supervisors. Nearly 2,000 soil conservation district supervisors have received training at these schools.

It is our sincere belief that one of the really great pieces of work being done in America is the work being done by the some 2,400 soil-conservation districts. We believe that the Federal Government should back up the work being carried out by these districts with adequate appropriations for technical assistance, research, and education.

One of the major objectives of our association is the control of floods and we believe that sound soil conservation practices do have a decided effect on the control of floods. They are not, however, a substitute for on-stream reservoirs as planned by the Corps of Army Engineers and authorized by Congress.

Sound soil conservation practices and small-watershed treatment, as advocated in the proposed Missouri River Basin agricultural program, offer a supplement to but not a substitute for the on-stream structures.

We recommend the adoption of that part of the Missouri River Basin agricultural program pertaining to stabilizing measures for small water courses, as advocated on page 113 of the letter from the Secretary of Agriculture to Congress dated October 5, 1949.

It is our belief that locally controlled and successful soil conservation districts should be used to the utmost in carrying out this program. The use of these agencies will reduce the total cost to the Federal Government, will create greater local interest, and will give to the entire program the benefit of counsel from those farmers who are so directly affected by the works accomplished.

The land classification program advocated has already been partly accomplished. Its speedy completion is in the national interest.

Many of the on-stream flood-control structures in the Missouri Basin will be completed within the next few years.

Above these reservoirs it is essential that every possible soil-conservation practice be installed at the earliest practical date.

While it is known that all of these great structures are so constructed that sedimentation will not be a major problem for many years, it is just common sense to take whatever measures can be taken to prolong their usefulness.

Every ton of soil that can be retained on the uplands through soil conservation practices and through watershed treatment will help to prolong the useful life of the larger and more expensive structures.

Congress has very wisely authorized 105 on-stream reservoirs in the Missouri Basin for our protection against floods, for irrigation, for conservation of water, for industrial and domestic purposes, for sanitation, hydroelectric power, for navigation, and for recreation and the propagation of wildlife.

This multimillion dollar investment should be protected in every possible manner. We believe that its greatest possible protection will come through sound soil and water conservation practices on the farms, and through small-watershed treatment under the guidance of existing State and Federal agencies.

The Agricultural Extension Service is the competent and logical group to assign the task of education. The Soil Conservation Service is well equipped to supply the technical services needed for this job. The Inter-Agency Committee in the Missouri Basin, although it has no legal status, has proved itself through the years as competent to coordinate this activity with the already authorized plan.

No new State or Federal agency is needed at this time.

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